SMALL-SCALE SUCTION DREDGING IN LOLO CREEK AND MOOSE CREEK
CLEARWATER AND IDAHO COUNTIES, IDAHO

Final
Environmental
Impact
Statement

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U.S. Forest Service
Clearwater National Forest

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Small-Scale Suction Dredging in Lolo Creek and Moose Creek

Final Environmental Impact Statement

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Abstract:

This Final Environmental Impact Statement documents the analysis of three alternatives, including a "no action" alternative, that were developed for the Small-Scale Suction Dredging analysis. The Notice of Intent to prepare this document was published in the Federal Register on April 4, 2003, and the Draft Environmental Impact Statement was released in April 2004.

After reviewing the effects of Small-Scale Suction Dredging and the three alternatives, Alternative 3 was selected as the preferred alternative by the Deciding Officer. This alternative allows Clearwater Forest's authorized Officers to approve, with no further National Environmental Policy Act (NEPA) analysis, a limited number of proposed Plans of Operations in specified reaches of Lolo, Moose, Independence, and Deadwood Creeks. Prior to approval, each suction dredge operator must have all pertinent Federal and State permits, and agree to specific operating conditions and mitigation measures designed to protect threatened fish species and their habitat. Alternative 3 also includes stream bank stabilization and reclamation of the abandoned Lolo #5 mining claim and installation of a fish-friendly drainage device or ford where Forest Road 5440 crosses Independence Creek.

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EXECUTIVE SUMMARY

The Clearwater National Forest is a geographically diverse area in North Central Idaho that contains occurrences of gold, silver, antimony and copper. Since the 1860s, placer gold mining has occurred in rivers and streams across the Forest. Four of the more productive streams, Lolo Creek, Moose Creek, and two Moose Creek tributaries, Independence and Deadwood Creeks have had sporadic mining activity over the years. With the rise of gold prices in the 1970s, these streams experienced a renewed interest in prospecting and exploration. It was also around this time that many prospectors started using suction dredges to explore and mine in stream gravels. While the numbers who actually prospect varies from year to year, miners presently have located and maintained 17 mining claims on Lolo Creek and 26 on Moose Creek. Ownership of the claims is shared by 18 potential suction dredge operators on Lolo Creek and 38 potential suction dredgers on Moose Creek (see Chapter 1.2).

Lolo, Moose, Independence, and Deadwood Creeks (hereafter referred to as Lolo Creek and Moose Creek) are most frequently mined by part-time, small-scale operations using suction dredges with nozzles ranging from two to five inches in diameter and gasoline-powered pumps up to 15 horsepower motor. Claimant activity ranges from short-term recreational uses (one to two weeks with a campout every year) to subsistence mining by individuals who supplement their income by extracting gold from their respective claims (see Chapter 1.2).

Until the late 1990s, Lolo Creek and Moose Creek miners conducted their suction dredge operations under Forest Services Regulations by notifying the Forest of their activities through a notice of intent to operate. The State of Idaho Department of Water Resources also required suction dredge operators throughout the State to apply for a 3804-A stream alteration permit. Attached to the Idaho Department of Water Resources (2006) 3804-A permit was a list of specific terms and conditions ("best management practices," or BMPs) for resource protection. National Forests in Idaho collectively agreed that operations that implemented the State's BMPs could operate in selected streams with minimal or no effect to fish and water quality (see Chapter 1.2.2).

In 1997, steelhead trout within the Snake River drainage were listed as a threatened species under the Endangered Species Act. In 1998, bull trout were also listed as a threatened species within the Snake River drainage. Steelhead occur in Lolo Creek, and bull trout occur in both Lolo Creek and Moose Creek. Steelhead are not found in Moose Creek due to the downstream Dworshak Dam. Dworshak Dam is a migration barrier to anadromous fish (see Chapter 1.2.2).

After the 2001 mining season, Clearwater National Forest initiated the process of consulting, under Section 7 of the Endangered Species Act, with National Oceanic and Atmospheric Administration Fisheries (NMFS) and U.S. Fish and Wildlife Service (USFWS) concerning the effects of small-scale suction dredging on these threatened species in Lolo Creek and Moose Creek. The Forest has not approved any plans of operation for dredging in Lolo Creek or Moose Creek, and no dredging has occurred since the 2001 mining season (see Chapter 1.2.2).

In a 2006 Biological Assessment (BA) completed by the Forest for Lolo Creek, the determination was made that suction dredging was "likely to adversely affect" steelhead trout, but was "not likely to adversely affect" Lolo Creek bull trout. In a BA for Moose Creek, the Forest determined that suction dredging was "likely to adversely affect bull trout". In their respective 2006 Biological Opinions, NMFS and USFWS agreed with the Forest Service's determinations. Both agencies concluded that suction dredging would not jeopardize the continued existence of either species.

Each agency's Opinion included incidental take statements with non-discretionary reasonable and prudent measures to avoid or minimize take, and mandatory terms and conditions to implement those measures (see Chapter 1.2.2). In Chapter 2 of this EIS each agency's reasonable and prudent measures, terms and conditions, and recommendations discussed in the Forest's 2006 Biological Assessments for Lolo Creek and Moose Creek are consolidated into 30 specific conservation reasonable and prudent measures.

Purpose and Need

The purpose and need answers the question "why" the proposed action is being considered. The purpose and need for the proposed action is to protect surface resources through the approval of acceptable mining Plans of Operations (see Chapter 1.3).

Purpose: Develop operating conditions and mitigations measures that protect surface resources, including threatened fish species, from impacts of suction dredging.

Need: Allow the Forest Service to approve, with no further environmental analysis, a limited number of Plans of Operations in specified reaches of Lolo Creek, Moose Creek, Independence Creek and Deadwood Creek.

Forest Service regulations found at 36 Code of Federal Regulations (CFR) 228.5 states that "a Plan of Operation will be analyzed by the authorized officer to determine the reasonableness of the requirements for surface resource protection." All mining proposals, including those submitted by small-scale suction dredge operators, are made under the authority of the United States mining laws (30 U.S.C. 21-45), which confer the statutory right to enter upon public lands for the purpose of exploration and development of mineral resources. The Clearwater National Forest received some Plans of Operation, and anticipates others of similar scale, from people proposing to use small-scale suction dredges to prospect, explore, and extract gold from instream gravels on and off placer mining claims in Lolo Creek and Moose Creek. The Forest Service is responsible to analyze these Plans of Operations and approve them, if the surface resource protection requirements found in these plans are reasonable (see Chapter 1.3).

The Forest Service has a responsibility to manage surface impacts from mining activities on National Forest System lands. Since miners have expressed a desire to continue mining on the Forest, the Forest Service initiated this environmental analysis, pursuant to mining regulations at 36 CFR 228.4 (f), to analyze the effects of suction dredging on resources and to develop mitigation measures to protect those resources. When included in Plans of Operation, these mitigation measures, along with necessary with State and Federal permits, will allow the Forest Service to approve the Plans of Operation with no further environmental analysis. Approved Plans of Operation will allow up to 18 small-scale suction dredge operations in Lolo Creek and up to 38 small-scale suction dredge operations in Moose, Independence and Deadwood creeks (see Chapter 1.3).

Issues

The issues addressed in this EIS resulted from public involvement efforts with individuals, citizen groups, environmental interest groups/organizations, industry, businesses, city and county governments, Federal and State agencies, and government-to-government consultation with the Nez Perce Tribe. Comments received from the public generated issues to be discussed in this document. The interdisciplinary team (ID team) reviewed and evaluated issues derived from this process to determine which issues were key issues. Certain issues were found to be non-relevant to the

decision, since they are outside the scope of the proposal, already decided by law or policy, beyond the geographic influence of the proposal, or not affected by the proposal and alternatives (see Chapter Two for rationale). These included mining claim validity, designating streams as wild and scenic and withdrawing streams from mineral entry, spill prevention containment and countermeasures plan, reclamation bond, road construction and road improvements, systematic data collection system, and watershed analysis prior to approving suction dredging operations. The following eleven issues were found to be relevant to the decision:

1. <u>Water Quality and Fish Habitat</u>

   Suction dredging cannot increase sediment in areas where the Forest Plan water quality standards are not being met. Water quality and fish habitat issues identified the need for suction dredge operators to get a National Pollutant Discharge Elimination System permit prior to operating. Endangered Species Act Section 7 consultation was also identified for salmon, steelhead, and bull trout. Most of the water and fish comments were directed toward the terms and conditions, monitoring and reclamation. Issues to address in the EIS included:

   - Many stream reaches lack woody debris.
   - Suction dredge mining can alter gravel suitable for spawning.
   - Suction dredge mining can cause direct mortality of threatened and other resident fish.
   - Spawning gravels are in short supply and may become a limiting factor if mining continues to degrade these important sites.
   - Disturbance of the armoring layer adversely impacts immediate mining site and downstream gravels and redds.
   - Systematic field investigations of each claim are needed to correct activities that are clearly harmful and/or illegal. Monitoring effects of past dredging activities should be represented in the EIS.
   - Reclamation:
     - EIS needs to describe the reclamation process and all associated costs in detail.
     - Reclamation should be concurrent with mining.
     - Analysis should include details on volume, type of material to be moved, and sequence for reclamation.
     - Forest Service costs for reclamation should be included.

2. <u>Fisheries and other Aquatic Organisms</u>

   Steelhead are found in Lolo Creek and Bull Trout are found in Lolo Creek and Moose Creek. Both fish are listed as threatened species under the Endangered Species Act. Spring Chinook, Westslope Cutthroat Trout, and Pacific Lamprey are listed as species of concern. Suction dredging impacts aquatic invertebrates, and could potentially impact amphibians and mussels.

3. <u>Nez Perce Tribe</u>

   Nez Perce Tribes Treaty Rights, salmon reintroduction, and watershed restoration efforts need to be included in the EIS.

4. Wildlife

   Impacts to threatened or endangered wildlife need to be analyzed in the EIS.

5. Riparian Vegetation

   Impacts on threatened or endangered plant species and the spread of noxious weeds needed to be addressed in the EIS.

6. Visual Resources, Noise and Recreation

   Suction dredge noise and potential impacts to visual resources and recreation needs to be analyzed. Suction dredge operations need to be set up in such a way as to not become a hazard to local tubers, swimmers, canoeists or other whitewater enthusiasts. Dredging operations should be kept away from developed campgrounds.

7. Socio-Economics

   The net public benefit from small-scale suction dredging needs to be addressed in the EIS.

8. Heritage and Cultural Resources

   Potential impacts of suction dredging on heritage and cultural resources in Lolo and Moose Creeks need to be addressed in the EIS.

Alternatives Carried Forward for Evaluation

Alternative 1: No Action

The "No Action" Alternative is required by regulation in 40 CFR 1502.14(d). It is used, in part, to determine the effects of not implementing an action alternative. For purposes of this EIS, the No Action Alternative is defined as not approving proposed plans of Plans of Operations. Under this alternative, miners who submit Plans of Operation for suction dredging in Lolo Creek and Moose Creek would not receive approval for their Plans of Operations. No suction dredging would be allowed under the Mining Laws or under any other authorization. There would be no reclamation work on existing structures or tailing piles.

This alternative could not be implemented under current law, including the Mining Law of 1872, and violates Forest Service regulations at 36 CFR 228A. However, this alternative provides a comparable environmental baseline against which to evaluate effects of the action alternatives. This is consistent with and legal under NEPA (40 CFR 1506.2(d)), which allows for analysis of alternatives that are not allowed under current law or regulations but that are valuable for exploring the range of effects.

Under this alternative, there would continue to be approximately the same level of traffic on Forest roads and approximately the same level of dispersed camping and other recreational activities.

Alternative 2: Proposed Action

Under this alternative, the Clearwater National Forest would annually approve with no further environmental analysis a limited number of Plans of Operation in specified reaches of Lolo Creek, Moose Creek, Independence Creek and Deadwood Creek. Approval would be contingent upon the operator complying with all Federal and State permitting requirements. The operator must also include in there plan of operations specific operating conditions and mitigation measures derived

from public comments, government-to-government consultation with the Nez Perce Tribe, and consultation with other government agencies. The mitigation measures are designed to protect threatened and endangered fish species and their habitat. The maximum number of operations approved in any year under this analysis is 18 for Lolo Creek and 38 for Moose Creek.

The terms and conditions with which proposed Plans of Operations have to comply in order to qualify for approval under this alternative are based on the reasonable and prudent measures listed in the Biological Opinions prepared by USFWS (2006) and USFWS (2006). The Forest Service has added additional elements to some terms and conditions and also included additional conditions in response to concerns raised during scoping.

Under this alternative, a claimant or operator would submit to the District Ranger a proposed Plan of Operations that included all of the specified terms and conditions. The proposed Plan would provide site-specific information sufficient for the District Ranger to determine that the terms and conditions would be adequate for protection of surface resources on that specific site. If the District Ranger determines that the proposed Plan of Operations meets the conditions and they are sufficient to protect surface resources on that site, the Plan of Operations could be approved with no further environmental analysis for that years operating season. If the District Ranger determines that the Plan of Operations does not meet these conditions and/or cannot protect surface resources, the Plan of Operations would not be approved pending the completion of a separate environmental analysis on the new proposed action. Any separate environmental analysis would require a separate Endangered Species Act Section 7 consultation with USFWS and/or NMFS.

Approval of any specific Plan of Operations would be in effect for the duration of the operating season from July 1 through August 15, as long as the operation is conducted within the terms and conditions. A new Plan of Operations would have to be submitted annually and approved for each dredge operation before each mining season.

Alternative 3: Suction Dredging and Stream Improvement Projects

The Deciding Officer has identified Alternative 3 as the Preferred Alternative. Alternative 3 is also the preferred alternative. This alternative is the same as Alternative 2, except that it includes two specific stream improvement projects.

The first project involves bank stabilization and reclamation of the abandoned Lolo #5 mining claim on Lolo Creek. The mitigation project would stabilize and reclaim approximately 950 feet of Lolo Creek, and would include the following components:

- Remove and/or recontour sediment producing overburden and tailings berm.
- Armor, and revegetate with native species as needed to provide a stable non-erodable stream bank along the west bank of Lolo Creek.
- Recontour and revegetate as needed existing overburden and tailings stockpiles away from existing emergent wetlands.

The second project would involve installation of a fish-friendly drainage device or ford where there is now an unimproved ford at the junction of Forest Road 5440 and Independence Creek. Neither of the projects would take place during critical salmonid spawning or migration periods, and both would follow all appropriate Best Management Practices to minimize short-term impacts due to construction.

Environmental Consequences

Water Quality and Fish Habitat

Water Quality.

Fine sediment and turbidity levels in Lolo, Deadwood, Independence, and Moose Creeks would remain unchanged under the No Action Alternative. Existing roads and camping would continue to contribute low levels of sediment and turbidity, as would the Lolo #5 abandoned mine area and Forest Road 5440 ford crossing Independence Creek. Under Alternatives 2 (Suction Dredging) and 3 (Suction Dredging and Stream Improvement Projects), there could be accidental spills of fuel or oil by suction dredge operators. Spill prevention measures listed in terms and conditions 26 and 27 should minimize the potential for such incidents (See Chapter 2.12). Under Alternative 3 (Suction Dredging and Stream Improvement Projects), there may be some added short-term potential for spills from construction projects. Implementation of Best Management Practices (IDL, 1992) during construction would minimize the potential for such spills. (See Chapter 4.3).

Suction dredging occurs in the confines of the stream channel and does not result in the discharge of any new sediment to the creeks, but rather dredging redistributes sediment from the streambed through the dredge and then back to the creeks. The low stream velocities that occur in July and August in both Lolo Creek and Moose Creek would decrease the opportunity for long-distance downstream transport of sediment. Any increases in turbidity would be for a very short duration while the dredge is operating. Fine sediment that might be removed from the substrate and discharged back into the water column would drop out within a short distance downstream, particularly in areas where stream velocities are greatly slowed, such as the head of a pool. Forest Service is required to visit each recreational dredge site at least five times between July 1 and August 15, or more often if problems occur, to monitor dredge activity, and effects of the mining on fish and fish habitat (NMFS, 2006). Operators will also be required to monitor the stream for 300 feet downstream immediately after beginning operation; if they observe noticeable turbidity, they must stop or reduce operations until there is no visible increase 300 feet downstream. (See Chapter 4.3).

In addition, under Alternative 3 (Suction Dredging and Stream Improvement Projects), recontouring, armoring and/or revegetating of the overburden and tailing materials and disturbed areas at the Lolo #5 mining claim would stabilize exposed stream banks and reduce or eliminate further sedimentation and increases in turbidity from this area. The project would reduce sediment loadings into Lolo Creek and improve water quality over the longer term. Similarly, installation of a drainage device or ford at the Forest Road 5440 crossing of Independence Creek would stabilize the channel and reduce the sediment and turbidity that result from and around the present ford. (See Chapter 4.3).

Hydrology and Stream Discharge.

Watershed conditions and management would remain unchanged under the No Action Alternative. Suction dredging under Alternatives 2 and 3 would not introduce sediment to or increase sediment in the Lolo Creek or Moose Creek study areas but rather would relocate it by removing it from the substrate, passing it through the suction dredge, and replacing it into the creek, where it would settle out within a short distance. Thus, allowing approval of small-scale suction dredging plans of operations would not affect the amount of stream flow, water yield, or annual sediment yield produced in either the Lolo Creek or Moose Creek watersheds. Alternative 3 would reduce annual

sediment yield from the Lolo #5 mining claim and from the Independence Creek ford. (See Chapter 4.1).

Stream Geomorphology.

Channel geomorphic conditions would remain unchanged under Alternative 1 (the No Action Alternative). Under both Alternative 1 (No Action) and 2 (Suction Dredging), unstable banks in the Lolo #5 area would remain unstable and would continue to be a sediment source to Lolo Creek. The Independence Creek ford would remain a possible fish barrier and sediment source. (See Chapter 4.2).

Under both Alternative 2 (Suction Dredging) and 3 (Suction Dredging and Stream Improvement Projects), operators cannot disturb instream structures such as large boulders and large, stable woody debris. If instream structures are disturbed, the disturbance could affect the energy and direction of stream flow and cause erosion and long-term changes in the channel. Operators must agree not to disturb such structures in order to be approved, so the potential for such impacts will be minimized. Under Alternative 3 (Suction Dredging and Stream Improvement Projects), potential sediment introduction will be reduced and both Lolo and Independence Creeks would be restored to a more stable condition. The fish barrier would be removed, and fish passage would be restored to the upper reaches of Independence Creek. (See Chapter 4.2).

Instream Habitat.

Under Alternative 1 (No Action), there would be no change in instream habitat. Suction dredging under Alternatives 2 and 3 could lead to short-term changes in habitat but terms and conditions of approval would prevent any long-term adverse changes. Although operators would disturb small distances of the creeks during the mining season, they have to restore the substrate before the end of the operating season, August 15. (See Chapter 4.5).

Operators must agree not to remove or otherwise disturb large woody debris, so there should be no effects on woody debris that enhances fish habitat. Dredgers will not be allowed to destabilize instream wood, potentially causing it to move from its natural location. Destabilizing instream wood could reduce pool frequency and quality and stream bank stability. (See Chapter 4.5).

Small suction dredging operations could increase pool frequency where dredging excavates pools and could partially fill existing pools with deposited tailings. An increase in pool frequency could temporarily improve stream channel diversity, a condition beneficial to many fishes and aquatic organisms. However, all operators would have to backfill all excavated pools by the end of the mining season. (See Chapter 4.5).

Suction dredging could alter pool dimensions and quality through excavation, dredge pile deposition, or changes in channel morphology. Operators must fill all excavated pools and disperse remaining dredge piles by the end of each mining season, so any changes would be minimized and temporary. (See Chapter 4.5).

Dredge operators may not dam streams, but some operators may build temporary rock barriers partially across the channel to facilitate flotation of dredges. Operators would have to break down all partial dams and dredge piles before the end of the operating season. Overall, any impacts from suction dredging would be very localized and minor. (See Chapter 4.5).

Fisheries and Other Aquatic Organisms.

Under Alternatives 1 (No Action) and 2 (Suction Dredging), fish habitat in the Lolo #5 area on Lolo Creek would continue to be degraded due to increased sediment, and the ford where Forest Road 5440 crosses Independence Creek would continue to be a sediment source and partial fish barrier.

In any given year, suction dredges under Alternatives 2 (Suction Dredging) and 3 (Suction Dredging and Stream Improvement Projects), could affect up to about 1.5 percent of aquatic habitat in the Lolo Creek study area and about 3.4 percent of the Moose Creek study area. (See Chapter 4.4).

The window for dredging operations would occur from July 1 to August 15. This would minimize impacts to most larval and juvenile fish, and would be after steelhead trout and bull trout emerge from the substrate. (See Chapter 4.4).

Salmonid alevins (larval stage between the egg and free-swimming fry or juveniles) could be crushed underfoot by operators, they could be trapped or smothered by tailings or fine sediment, and they could be sucked into the suction dredge intake. In Lolo Creek, where steelhead trout and Chinook salmon occur, the likelihood of this occurring is considered to be low. Spawning areas will be identified during the pre-mining review and avoided, and the July 1 to August 15 operating window minimizes times when larval stage between the egg and free-swimming steelhead and Chinook fry would be present. In both Lolo Creek and Moose Creek, operators are allowed only in areas of large substrate not preferred by steelhead and bull trout spawning, and operators have to use a 3/32-inch screen over their intake hoses. All of these conditions, combined with the fact that the Forest Service must inspect the operations at least five times during the suction dredge season, should minimize the potential for impact to fisheries. (See Chapter 4.4).

There would be minimal impacts from disturbance and dislocation due to the small-scale nature of individual operations and terms and conditions that require restoration of the substrate. As noted above, there could be spills or increased sediment and turbidity, but the terms and conditions with which operators must comply should minimize the potential for any impacts on water quality. (See Chapter 4.4).

Alternative 3 (Suction Dredging and Stream Improvement Projects) would lead to long-term improvements in fish habitat in the Lolo #5 area of Lolo Creek, and would remove a sediment source and partial fish barrier on Independence Creek. (See Chapter 4.4).

<u>Threatened or Endangered Fish</u>.

Steelhead trout and bull trout occur in Lolo Creek. Only bull trout occur in Moose Creek; the downstream Dworshak dam blocks migration of anadromous fish, including fall Chinook salmon and steelhead trout. (See Chapter 4.7).

Chinook Salmon. A reach of the mainstem Clearwater River has been designated as critical habitat for fall-run Chinook salmon. There would be no impacts from the No Action Alternative. The closest essential fish habitat for fall-run Chinook is over 25 miles downstream of the Lolo Creek study area, and fall-run Chinook are not known to spawn in the Lolo Creek study area. Suction dredging under Alternatives 2 (Suction Dredging) or 3 (Suction Dredging and Stream Improvement Projects) should not cause impacts to fall-run Chinook. (See Chapter 4.7).

Steelhead Trout. The Lolo Creek steelhead population is a combination of natural and hatchery fish, and the creek produces very few natural steelhead due to poor adult returns and habitat conditions.

Spawning and juvenile rearing does not occur in Lolo Creek. Juveniles have been documented to occur at most sampling stations. There would be no impacts from the No Action Alternative. The dredging season under Alternatives 2 (Suction Dredging) or 3 (Suction Dredging and Stream Improvement Projects) occurs after most steelhead emerge from the substrate and before juveniles migrate downstream, so there should be minimal direct impacts. The major effect to steelhead trout from suction dredging would be displacement of fish during dredging operations and possible delays in fish movement through the dredge area. The terms and conditions of approval would minimize or avoid adverse effects on steelhead trout populations and habitat. The stream improvement projects under Alternative 3 would disturb 950 feet of Lolo Creek and 30 feet of Independence Creek during construction. The construction would use Best Management Practices (IDL, 1992) to minimize impacts and would not occur during critical periods of the steelhead life cycle. (See Chapter 4.6).

Bull Trout. In the Lolo Creek project area, no bull trout were identified during 1996-1999 and 2001 monitoring, despite extensive fish surveys, and only six bull trout were identified from 570 survey stations in Lolo Creek from 1987 to 1994. Habitat conditions and warmer temperature regimes limit bull trout production in the Lolo Creek drainage, and fish population data do not indicate any bull trout spawning and early rearing in the Lolo Creek drainage. (See Chapter 4.6).

In Moose Creek drainage, fish population data prior to 2000 indicated that limited bull trout spawning and rearing was occurring. However, additional snorkeling surveys conducted during 2000-2001 found higher numbers of adult bull trout. Due to past mining, road construction and timber harvest, habitat conditions have been degraded in the Moose Creek drainage, and the drainage has been designated an adjunct watershed for bull trout recovery efforts. Under the No Action Alternative, there would be no effects on bull trout. (See Chapter 4.6).

In Lolo Creek, suction dredging under Alternatives 2 (Suction Dredging) and (Suction Dredging and Stream Improvement Projects) would have minimal impact because there are very few bull trout present, there is limited to no spawning and rearing, and because the suction dredge operating season is during a period that minimizes the likelihood of bull trout being present or spawning in the project area. (See Chapter 4.6).

In Moose Creek, there is some potential for impacts to bull trout from displacement and from habitat alteration. Under Alternatives 2 and 3, no dredging would be allowed in areas where bull trout are known to spawn, or in areas the Forest Service identifies as spawning habitat. In addition, the impacts of small-scale suction dredging on bull trout eggs, alevins, or fry would be minimal because bull trout hatch in January and February, remain in the gravel until only April or May, and then leave the gravel before the dredging season opens on July 1. Terms and conditions of approval would minimize the potential for impacts from habitat alteration. The stream improvement projects under Alternative 3 would disturb 950 feet of Lolo Creek and 30 feet of Independence Creek during construction (see Chapter 4.6). The construction would use Best Management Practices (IDL, 1992) to minimize impacts and would not occur during critical periods of the bull trout life cycle. (See Chapter 1.2.2).

<u>Sensitive Species</u>.

According to the Forest Service Region 1 Sensitive Species List, three sensitive species, Spring Chinook, Westslope Cutthroat Trout, and Pacific Lamprey can be found in the Lolo Creek drainage. Only Westslope Cutthroat Trout is found in the Moose Creek drainage. (See Chapter 4.7).

Spring Chinook. Spring-run Chinook are present in Lolo Creek, and natural populations are supplemented by fish from the Nez Perce Tribal Hatchery. The mining season (July 1 through August 15) occurs after the previous year's brood offspring are out of the gravel and prior to current-year spawning, so potential impacts to spring-run chinook should be limited to displacement or avoidance during the hours of dredging activity and localized reductions in macroinvertebrate food availability. The stream improvement projects under Alternative 3 would disturb 950 feet of Lolo Creek and 30 feet of Independence Creek during construction. The construction would use Best Management Practices (IDL, 1992) to minimize impacts and would not occur during critical periods. (See Chapter 4.7).

Westslope Cutthroat Trout. Impacts to cutthroat trout, which has been proposed for listing as a threatened species, would be similar to those for steelhead trout and bull trout described above. (See Chapter 4.7).

Pacific Lamprey. Pacific lamprey is a federal species of concern and is listed by the Idaho Department of Fish and Game as a State endangered species. Pacific lamprey do not occur in the Moose Creek drainage due to the Dworshak dam. Pacific lamprey have not been known to specifically occur in the Lolo Creek project area and suction dredging will avoid the spring/early summer spawning period for lamprey. Effects to juveniles within the sandy substrates will be minimized through the avoidance of potential rearing areas. Other potential impacts would be similar to those for steelhead trout and bull trout described above. (See Chapter 4.7).

<u>Aquatic Invertebrates</u>.

The operation of small-scale suction dredges would displace some insects downstream but should result in minimal amounts of injury or mortality to aquatic insects. For a short period, while insects were in the water column before settling back into the substrate, they would be more susceptible to being eaten by fish or other aquatic organisms. This would be temporary. (See Chapter 4.6).

Exposure of previously buried substrate and covering of existing substrate can locally reduce abundance of benthic invertebrates. However, most aquatic invertebrates species can re-colonize disturbed sites within several weeks. (See Chapter 4.6).

Dislodged fine sediment would be distributed downstream of the dredged area and could temporally fill interstices in gravel and cobble, reducing available macroinvertebrate habitat in the immediate area. However, scouring action during the next period of high flow would likely clear out any such sediment accumulations and allow aquatic insects to re-colonize the habitat. Also, the low percentage of fine sediment, particularly in Lolo Creek, would significantly reduce the likelihood, and the extent, of potential temporary impacts. (See Chapter 4.6).

The Lolo #5 restoration project would disturb about 950 feet of the west bank of Lolo Creek, and would kill or displace aquatic invertebrates in this area. Fine sediment in the disturbed area would be washed downstream and could temporarily reduce macroinvertebrate habitat. The west bank is presently a sediment source, but over the longer term, stabilizing the bank would reduce sediment transport and improve habitat for aquatic invertebrates. (See Chapter 4.6).

The Independence Creek improvement project, similarly, would disturb the full width of the creek for approximately 30 feet and result in increased sedimentation immediately downstream until seasonal high flows scoured out accumulated sediments. Following completion of the project, fish passage to the upstream reaches of Independence Creek will be restored for migrating fish.

Nez Perce Treaty Rights and Traditional Uses.

The Nez Perce Tribe has "... the right of taking fish at all usual and accustomed places...together with the privilege of hunting, gathering roots and berries...." in both the Lolo Creek and Moose Creek project areas. The Nez Perce Tribe has identified salmon as an integral part of tribal religion, culture, and physical sustenance, and has indicated that the annual return of the salmon allows the transfer of traditional values from generation to generation. They have indicated that Lolo Creek in particular is an important stream in restoration efforts for chinook salmon in the Clearwater River Subbasin. (See Chapter 4.15).

Under the No Action Alternative, impacts to fish and other resources would not change from the current conditions. Under Alternatives 2 (Suction Dredging) and 3 (Suction Dredging and Stream Improvement Projects), suction dredging could cause impacts on tribal fishing access and traditional tribal resources. During the mining season, the areas being mined may not be the most desirable for tribal fishermen. Dredging noise, activities in and near the streams that scare away fish, and the presence of non-tribal members may make for a climate that is less than optimal for this traditional practice. (See Chapter 4.15).

In addition, suction dredging could affect tribal hunting by making the areas less desirable for tribal hunters and by causing game animals to avoid stream corridors during daylight hours. Suction dredging would not cause direct impacts to tribal gathering activities, since camas, whitebark pine seeds, berries, and other commonly gathered foods are not found in the stream channel. (See Chapter 4.15).

Wildlife.

Potential impacts of suction dredging on terrestrial wildlife would be predominantly within the riparian zone along the streams. Management indicator or sensitive wildlife species possibly affected would include belted kingfisher and boreal toad nesting. Minor disturbance by traffic and dispersed camping would continue under the No Action Alternative. The presence of suction dredge operations under Alternatives 2 (Suction Dredging) and 3 (Suction Dredging and Stream Improvement Projects) would not disturb kingfisher nesting. Once eggs hatch, brood rearing by kingfishers would essentially complete prior to the mining season so there would be no effects on rearing young. Foraging individuals could be locally disturbed and move away from dredging operations to hunt. Aquatic amphibians (e.g., boreal toad) could be affected through entrainment of eggs and young in the early stages of development. Approval conditions prohibit suction dredging into the banks of streams (Chapter 2.1), which are the areas that could potentially cover amphibian eggs and preferred habitat, and this would reduce the potential for impacts on local and forest wide population levels of boreal toad. (See Chapter 4.8).

Impacts to threatened, endangered, or sensitive wildlife species would be negligible. Additionally, lynx, and gray wolves are not known to inhabit the project areas. For at least 10 months of the year, the temporary noise and other human impacts associated with small-scale dredging would not likely jeopardize the continued existence of the gray wolf, and would result in no adverse effect on bald eagles, lynx, or their habitats. (See Chapter 4.8).

Under Alternative 3, noise and human activity associated with construction of the Lolo #5 restoration project and installation of a drainage device or ford at the Forest Road 5440 crossing on Independence Creek would cause wildlife to avoid the areas, at least during the hours of operation.

Individual kingfishers and boreal toads could be disturbed and dislocated, and toads could be killed. Otherwise, there would be no significant effects on individual organisms or populations.

Riparian Vegetation.

There would be no effects on riparian vegetation under the No Action Alternative. Suction dredging under Alternatives 2 (Suction Dredging) or 3 (Suction Dredging and Stream Improvement Projects) would not substantially alter riparian vegetation and wetland plant communities in either Lolo Creek or Moose Creek. Stream banks are generally well vegetated and cobbles and boulders provide armor to the banks. Equipment would be manually moved across the riparian zone to the dredge site. (See Chapter 4.9).

Suitable habitat for Macfarlane's four-o'clock (*Mirabilis macfarlanei*), water howellia (*Howellia aquatilis*) and Ute ladies'-tresses, (*Spiranthes diluvialis*) was modeled as part of the Endangered Species Act consultation process. The Lolo Creek and Moose Creek watersheds did not contain suitable habitat for the three federally listed plants. (See Chapter 4.9).

Under Alternative 3, the restoration of Lolo Creek in the Lolo #5 area would have a short-term adverse effect on existing riparian vegetation and wetlands, but would ultimately increase channel stability and increase the stability and quality of riparian habitat by reducing future damage from high stream flows. Prior to project implementation, the Forest Service would identify and delineate any jurisdictional wetlands in the Lolo #5 project area and comply with any applicable requirements under Section404 of the Clean Water Act. (See Chapter 4.9).

Visual Resources, Noise and Recreation

Visual Resources.

Overall, neither of the study areas is very diverse, with a low to moderate degree of inherent scenic attractiveness. The creeks themselves are the only distinctive features. Neither area has been assigned Visual Quality Objective (VQO). Travel routes and trails near Lolo Creek are managed with VQOs ranging from Retention (human activities not evident to casual visitors) to Partial Retention (human activities may be evident but remain subordinate to the characteristic landscape). Travel routes near Moose Creek are managed as Retention. (See Chapter 4.11).

There would be no effects on visual resources under the No Action Alternative. Suction dredging under Alternatives 2 (Suction Dredging) or 3 (Suction Dredging and Stream Improvement Projects) would not cause changes to the VQOs. It is possible that suction dredge operations in Lolo Creek could be seen from either of the historic trails but this is unlikely due to topographic and vegetative screening. Views from the Lolo Creek Campground area would also be limited. Similarly, in both creeks some suction dredge operations could be visible to visitors on nearby roads, but this is unlikely due to topographic and vegetative screening. Under Alternative 3, construction equipment would be visible from the roads during the relatively short periods while the stream restoration projects were being implemented. (See Chapter 4.11).

Noise.

Both the Lolo Creek and Moose Creek drainages are in heavily forested natural settings. The creeks, wind, local topography, and vegetation all influence the acoustic environment. Similarly, noise from generators and other equipment at campsites, and from passing vehicles on Forest Service roads, is audible to visitors. In the Lolo Creek project area, the primary sensitive noise receptors would be

visitors in the Lolo Creek Campground and on the Nez Perce National Historic Trail or Lewis and Clark National Historic Trail. There are no sensitive noise receptors in the Moose Creek area other than non-mining recreational visitors. There would be no change from current conditions under the No Action Alternative. (See Chapter 4.12).

Suction dredging under Alternatives 2 (Suction Dredging) or 3 (Suction Dredging and Stream Improvement Projects) would generate noise from pumps used to dredge material from the stream bottom and in some cases an air compressor used to supply air to the dredge operator (there is no blasting associated with suction dredging). The maximum noise level at very close range for gasoline engines of the size used by suction dredge operators is approximately 60-70 decibels. The actual noise levels would depend on many variables, including distance between the receptor and the source, wind, atmospheric pressure, other weather conditions, topography, time of day, etc.

Unlike a resident, who is exposed to repeated noise events over time, a visitor may not or may not experience a noise event during a visit. The people affected during mining periods would mostly be the miners themselves, hikers, fishermen, and other dispersed users in the area. (See Chapter 4.12).

Recreation.

Both the Lolo Creek and Moose Creek project areas are managed as “Roaded Natural” under the Recreation Opportunity Spectrum (ROS) which is characterized by mostly natural-appearing landscapes with some chance for privacy. Moose Creek is more remote and has fewer visitors. The Lewis and Clark National Historic Trail is near the southern boundary of the Lolo Creek project area and the Nez Perce (Nee-Me-Poo) National Historic Trail crosses the northern part of the Lolo Creek project area. (See Chapter 4.10).

There would be no change in recreational use or impacts to recreational visitors under the No Action Alternative. Suction dredging under Alternatives 2 (Suction Dredging) or 3 (Suction Dredging and Stream Improvement Projects) should have minimal or no impact on recreation visitors and no change in the ROS in either Lolo Creek or Moose Creek. Most people camping in the immediate vicinity of the mining claims are miners or prospectors, so the impacts of noise from suction dredge pumps and/or compressors would not be expected to be annoying, or not as annoying as they would be to non-miners. Because non-mining campers generally prefer other areas for camping, it is likely there would be no increase or decrease in campsite concentration, and thus no overall change in the number of recreational visitors. (See Chapter 4.10).

The physical presence of suction dredges and associated noise during operation may detract from the recreational fishing experience during the mining season for some fisherman. In the short term, suction dredge operations dislodge insects and other food organisms from the substrate. Suction dredge operators note that there is a temporary increase in fish feeding on the dislodged insects and organisms in the dredge pit and directly downstream of their suction dredge operations. The total area proposed for suction dredging will be less than one (1) percent of the total area of mainstem Lolo Creek (USFS, 2006a). Fishing opportunity does exist on more than ninety-nine (99) percent of the total area of mainstem Lolo Creek and on dredge sites in the late afternoon or evenings when the suction dredge operations stop for the day (See Chapter 4.10).

Under Alternative 3, heavy equipment would be needed for both the stream restoration in Lolo Creek and the crossing improvement project on Independence Creek. This should not affect suction dredge operators. There would be noise and visual disturbance for the duration of the construction projects, however, which could have a minor effect on other recreational visitors. Because there are

abundant other areas with the same or better recreational opportunities, there would be no significant effect on recreation from this alternative, and no change to the ROS in either watershed. (See Chapter 4.10).

Socioeconomics.

The Forest Service assumes that the number of visitors and campers in the Lolo Creek study areas would be approximately the same whether suction dredging plans of operations are approved or not. Thus, the economic impacts of suction dredging under Alternatives 2 (Suction Dredging) and 3 (Suction Dredging and Stream Improvement Projects) would be generally equivalent to those from camping and other recreational use under the No Action Alternative. In Lolo Creek, using very conservative assumptions, estimated expenditures would be $97,200 per year, which would amount to less than 0.07 percent of Clearwater County's total annual income. In Moose Creek, total expenditures would be $162,000 per year, which would amount to less than 0.01 percent of the Missoula County's total annual income. This level of expenditure would have a negligible effect on county or larger-scale economies. (See Chapter 4.13).

The amount of gold that is recovered by small-scale suction dredge operators is not known, so the loss of income that would result from not approving suction dredge plans of operations cannot be estimated. However, the Forest Service does not believe the amount is significant, and so the loss of income under the No Action Alternative would not have a significant effect on local or larger-scale economies. In addition, total expenditures for equipment and fuel for each operator would be about $800 per year, which would have no effect on local economies. (See Chapter 4.13).

Heritage Resources.

Suction dredging could affect heritage resources in both the Lolo Creek and Moose Creek study areas. The heritage resources inventory has been completed for both study areas, there are 14 recorded resources in the Lolo Creek area and 22 heritage resources sites in the Moose Creek area. Until a formal determination is made, these resource sites are treated as eligible for nomination to the National Register of Historic Places. (See Chapter 4.14).

Under all alternatives, camping activities have the potential to adversely affect historic mining sites and Native American resources in both the Lolo Creek and Moose Creek areas. Under Alternatives 2 (Suction Dredging) and 3 (Suction Dredging and Stream Improvement Projects), suction dredging could affect resources within the creeks themselves. Should a suction dredge operator uncover a resource while working, work would have to be stopped immediately, pending inspection by the Forest archaeologist. This would minimize potential impacts on heritage resources. Under Alternative 3, restoration of the Lolo #5 area could affect any resources in that area; again, if any resources are discovered during construction, operations would stop pending inspection by a Forest Service archaeologist. (See Chapter 4.14).

Potential Cumulative Effects

In the past, both Lolo Creek and Moose Creek have been impacted by road construction, timber harvest, mining, and grazing practices that added sediment to the stream. Impacts from these former activities (mostly road construction and timber harvest) are still evident in the stream channels of both drainages. Although instream conditions are considered static, modeling indicates the current trend is hydrologic recovery in the watersheds and decreasing sediment delivery to the streams

channels. Therefore, instream recovery is expected to slowly occur in the next several decades. An improving trend in cumulative watershed sediment effects has been observed on a Forest-wide scale. (See Chapter 4.16).

Timber harvest, grazing, and road maintenance is expected to continue in these watersheds. Each of these activities will have some impact in the vicinity of the proposed projects. Sediment generation, riparian vegetation degradation, and noise impacts are associated with these activities. No significant increases in any of these activities is expected, so there should be no increases in cumulative impacts. (See Chapter 4.16).

Comparison of Environmental Consequences

A comparison of environmental consequences and purpose and need criteria among the alternatives indicates that Alternative 1, the "No Action" would continue to be approximately the same level of traffic on Forest roads with the same level of dispersed camping and other recreational activities. Alternatives 2 and 3 would be similar in terms of environmental consequences. Implementation of Alternative 3 would present some additional short-term construction-related impacts, but would result in improvements to present in-stream water quality and suspended solids conditions and would increase streambank stability.

Preferred Alternative

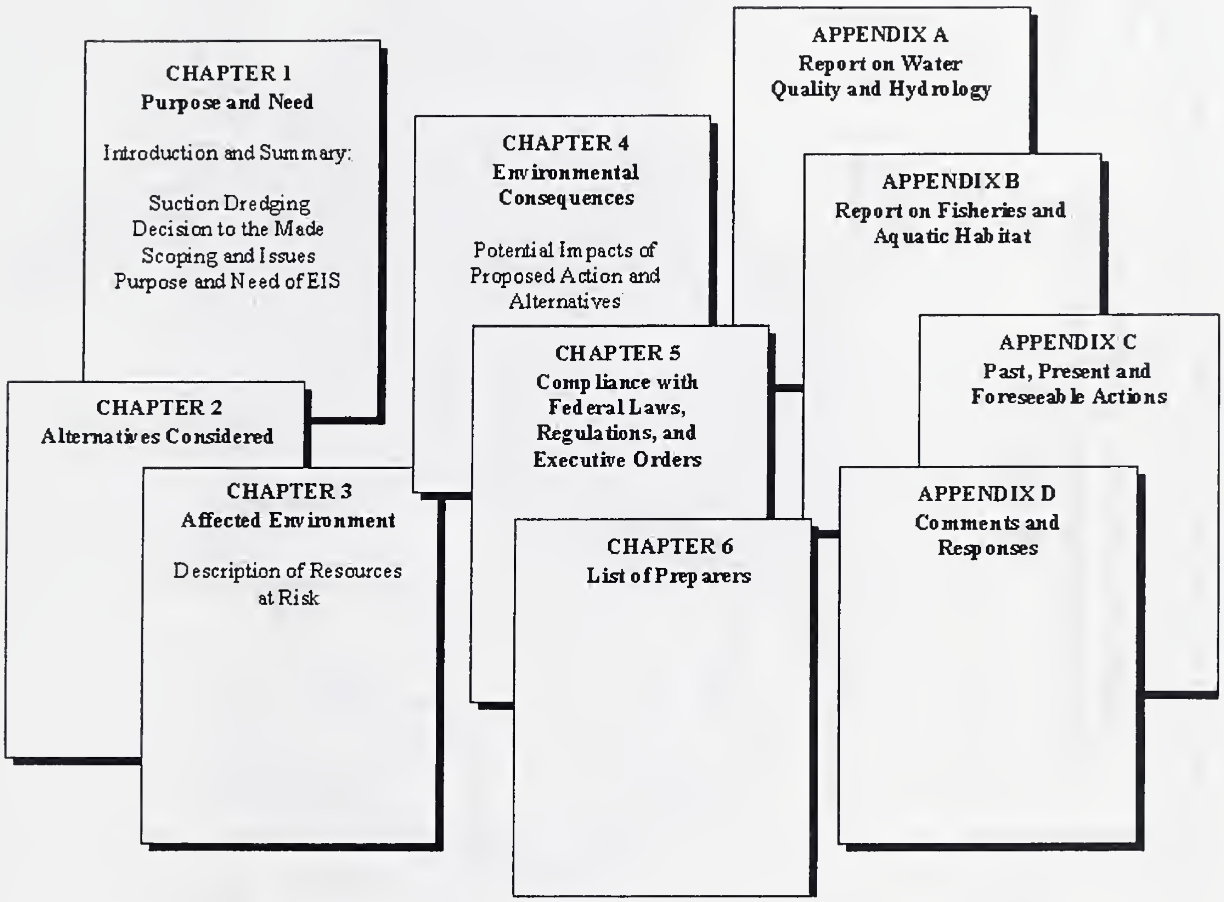
The Forest Service Deciding Officer has selected Alternative 3 (Suction Dredging and Stream Improvements) as the preferred alternative. The Forest Service would conduct the stream improvements.

1.0 Purpose and Need

This Environmental Impact Statement (EIS) has been prepared in compliance with the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321 *et seq.*) and Council on Environmental Quality (CEQ) *Regulations for Implementing the Procedural Provisions of NEPA* (40 CFR Parts 1500 - 1508).

1.1 Structure of the EIS

The EIS is organized as follows:



1.2 Introduction and Background

The Clearwater National Forest is a geographically diverse area in central Idaho that contains occurrences of gold, silver, antimony and copper. Since the 1860s, placer gold mining has occurred in rivers and streams across the Forest. Four of the more popular gold producing streams, Lolo Creek, Moose Creek, and two Moose Creek tributaries, Independence and Deadwood Creeks), have had sporadic mining activity over the years (see Figure 1-1). With the rise in gold prices in the 1970s, both streams experienced a renewed interest in prospecting for gold. It was also around this time that prospectors started using suction dredges to explore and mine instream gravels. While the numbers who actually prospect varies from year to year, miners have established and maintained 17 mining claims on Lolo Creek and 26 on Moose Creek. Ownership of the claims is shared by 18 potential suction dredge operators on Lolo Creek and 38 potential suction dredgers on Moose Creek. The claims were located under the Mining Law of 1872 (see box in Section 1.5).

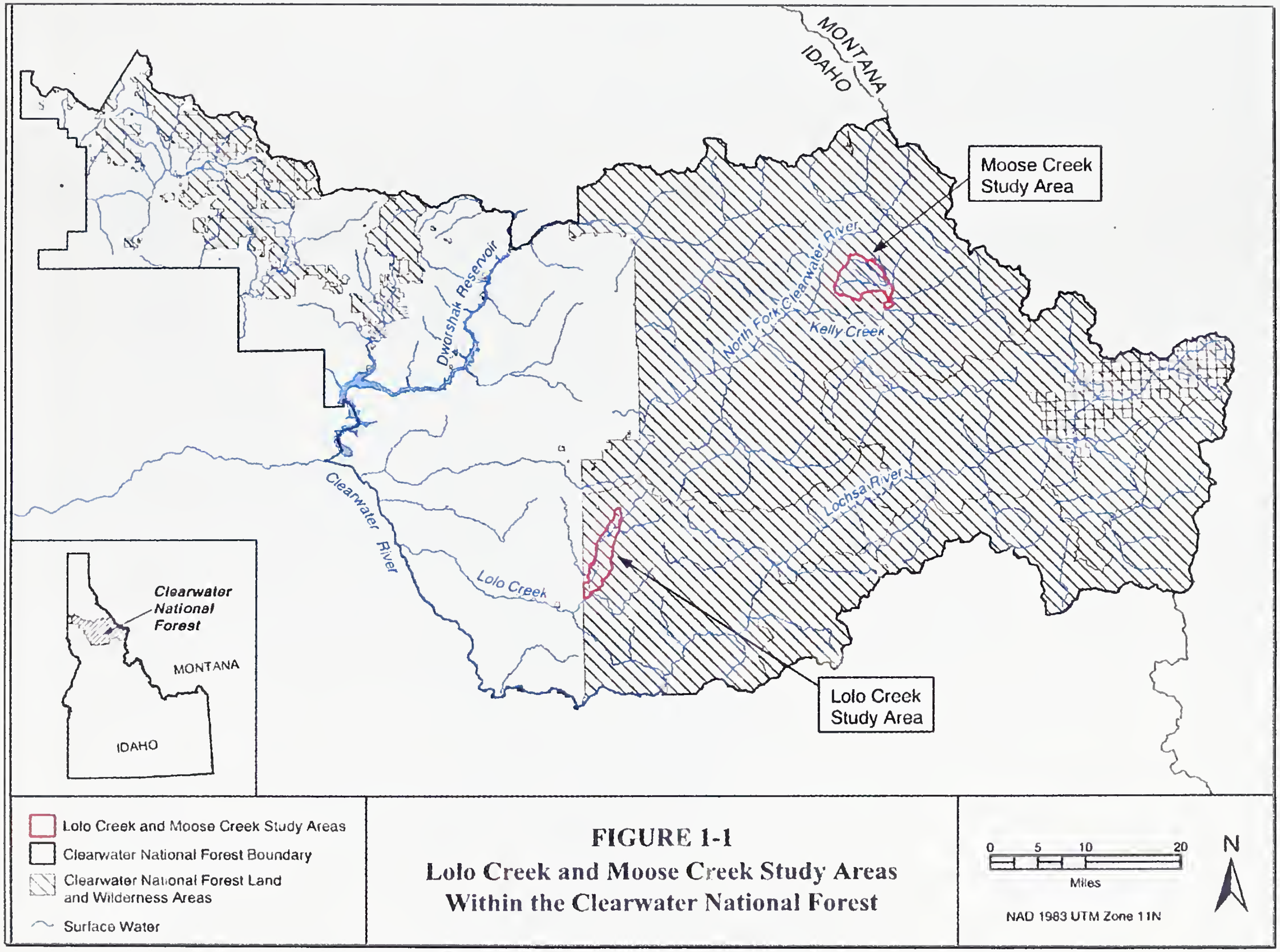


Figure 1-1. Lolo Creek and Moose Creek Study Areas Within the Clearwater National Forest

Lolo Creek and Moose Creek are most frequently explored by part-time, small-scale operations using suction dredges with nozzles from two to five inches in diameter and gasoline-powered pumps up to 15 horsepower.[1] Claimant activity ranges from short-term recreational uses (one to two weeks with a campout every year) to subsistence mining by individuals who supplement their income by extracting gold from their respective claims. The next section describes where and how they mine.

1.2.1 Overview of Small-Scale Suction Dredging

Gold is found in Lolo and Moose Creek drainages as alluvial placers where the gold is concentrated in past or present stream channels. To form placer deposits, gold is eroded from its parent rock upstream and carried downstream by the action of the water. The particles range in size from "flour" gold (generally, minus-400 mesh, or less than 0.0015 inches in diameter) to much larger nuggets. The distance gold particles move depends on the size and shape of the particle and on the energy of the stream. Gold is picked up where currents are fast and deposited when stream velocity slows. One typical area where stream velocity decreases is where the stream enters a pool. Other areas include the inside curve of bends, where the flow is slower than in the main channel and outside bend. Water also slows in eddies on the downstream sides of obstructions in the stream, such as rocks, vegetation, logs, or bedrock outcrops. As one of the denser materials transported by any stream, gold is among the first to drop out when a stream slows and energy diminishes. Unless the gold is picked up again, it often sifts down to a hardpan layer or to bedrock by the action of gravity.

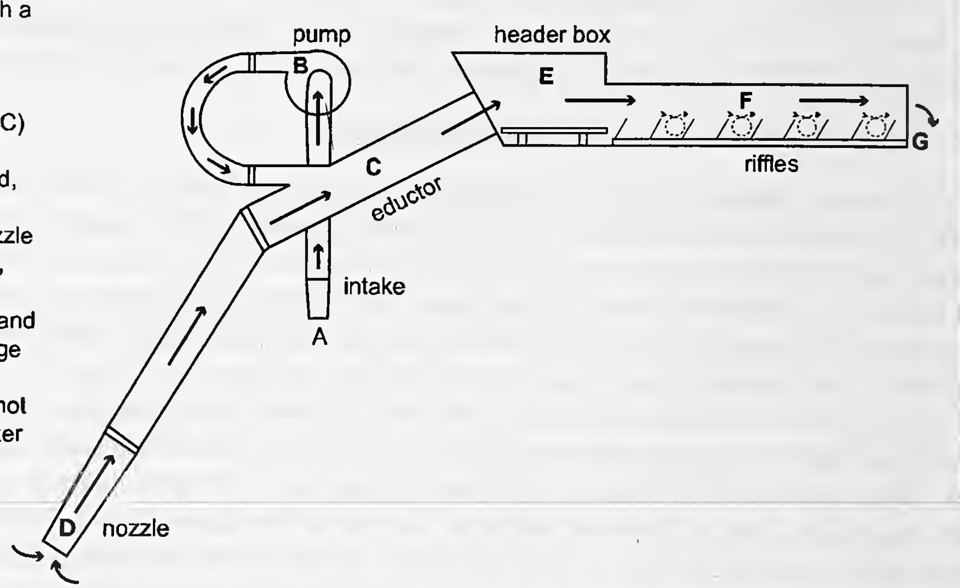
Miners have long recognized how and where gold is likely to be concentrated and have operated accordingly. Most streams in Idaho were explored in the 1800s, and many continue to give up gold to miners. In Lolo and Moose Creeks, gold is recovered by operators who use small-scale suction dredges. Figure 1-2 shows a typical suction dredge and identifies its basic components. Dredges typically use gasoline-powered pumps to create suction in a flexible pipe up to five inches in diameter. The suction pulls stream sediment, gravel and small rocks, and other materials (collectively, the "overburden") from the stream bottom, along with any gold. All this material is routed through the header box and onto a sluice box. The sluice box channels the water and other material over a series of riffles that serve to create pockets of slow water immediately behind each riffle -- the heavier material, including any gold, settles behind the riffles and the rest goes directly back into the stream. The entire system (e.g., gasoline-powered engine, pump, and sluice box) is mounted on adjustable stilts or a floating platform that is anchored or tethered near the work area.

Operators try to maintain a hole open down to bedrock in which to work. As the operator advances upstream, cobbles and rocks too large to be vacuumed up through the nozzle and suction hose are placed to the edge or back of the hole while dredged material is pumped through the sluice box and — except for gold and other heavy materials that may settle out behind riffles — immediately discharged out of the sluice box and back into the stream.

Some operators operate air compressors that provide air to "divers" so they can remain under water while examining and suction-dredging deeper holes. A rule of thumb is that up to one foot of overburden can be worked economically for each inch of dredge-hose diameter (USFS 2001c).

[1] In the distant past, parts of Moose Creek were mined using high-pressure hydraulic monitors and draglines, and parts of Lolo Creek were mined with large dredges, backhoes, and dozers. These mining practices rerouted the streams and left portions of the banks and stream channels in unstable condition.

Water is sucked through a screened intake (A) by water pump (B). The force of high pressure water into the eductor (C) creates a suction at nozzle (D). Water, sand, gravel and gold are sucked through the nozzle into the header box (E), across the riffles (F) where gold is trapped, and out the end of the dredge (G) into the stream. Streambed material is not sucked through the water pump.



Adapted from Siskiyou National Forest 2001

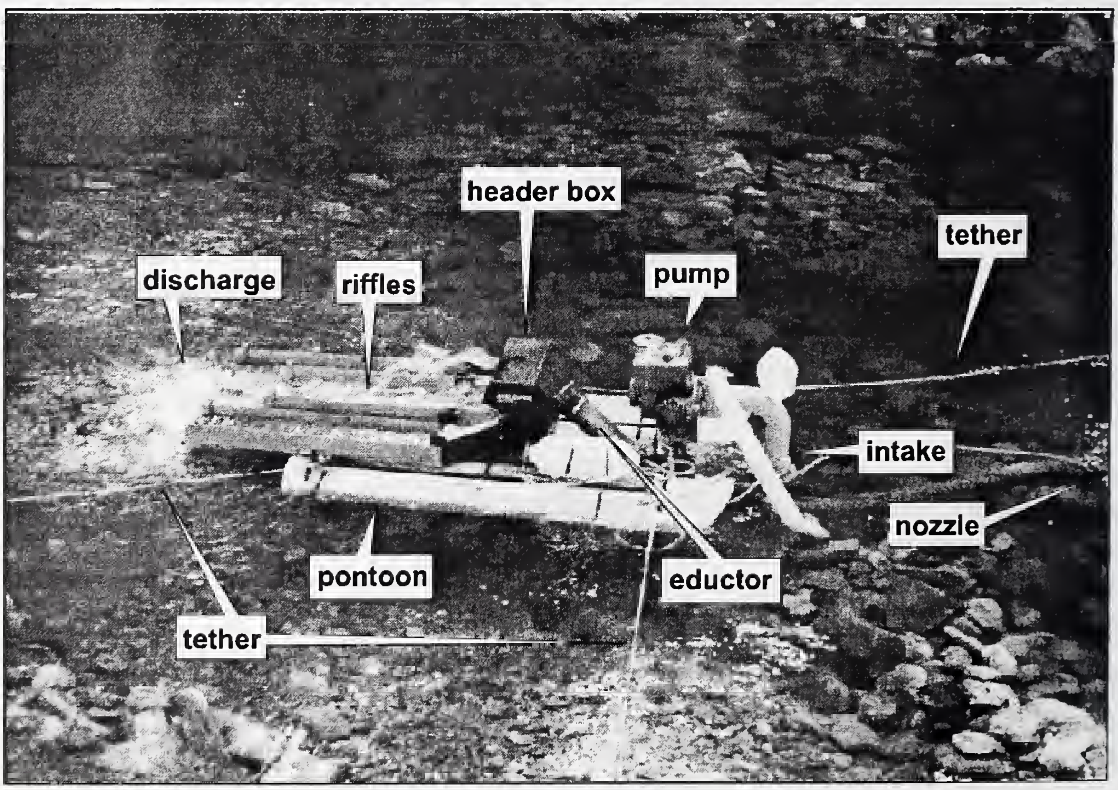


Figure 1-2. Typical Small-Scale Suction Dredge

Small-scale suction dredge operators prospect or explore and mine only a relatively short distance each mining season, from less than 10 feet of stream up to a maximum of perhaps 200-300 feet. Significant lengths of Lolo and Moose Creeks have experienced some form of past mining, many of the previously impacted sites have not been suction dredged to date. Suction dredge operators search for areas that were overlooked or avoided by past miners. Many of the Lolo and Moose Creek suction dredge operators have found gold in previously mined areas by meticulously exploring cracks and crevices in bedrock. The amount of material worked by small-scale suction dredgers varies widely, from less than a cubic yard per day up to 5 or 10 cubic yards per day.

1.2.2 Need for an EIS

Until the late 1990s, Lolo Creek and Moose Creek miners conducted their suction dredge operations under Forest Services Regulations (36 CFR Part 228) by notifying the Forest of their activities through a notice of intent to operate. The State of Idaho Department of Water Resources also required suction dredge operations throughout the State to apply for a 3804-A stream alteration permit. Attached to the Idaho Department of Water Resources (2006) 3804-A permit was a list of specific terms and conditions ("best management practices," or BMPs) for resource protection. In an effort to streamline the process, National Forests in Idaho collectively agreed that operations that implemented the State's BMPs could operate in selected streams with little or no effect to fish and water quality. Consequently, small-scale suction dredge operations were generally considered by the Clearwater and other National Forest in Idaho to have minimal effect, not requiring additional review and approval of Plan of Operations for each operator.

In 1997, steelhead trout were listed as a threatened species within the Snake River drainage under the Endangered Species Act. In 1998, bull trout were also listed as a threatened species within the Snake River drainage. Since the listings, the Forest has consulted with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) regarding the potential effects that Forest activities might have on these species.

After the 2001 mining season, Clearwater National Forest initiated the process of consulting, under Section 7 of the Endangered Species Act, with NMFS and USFWS concerning the effects of small-scale suction dredging on these threatened species in Lolo Creek and Moose Creek. Pending completion of these consultations, the Forest did not approve any Plans of Operation for dredging in Lolo Creek or Moose Creek, and no dredging has occurred since the 2001 mining season.

In a 2004 Biological Assessment (BA) completed by the Forest for Lolo Creek, the determination was made that suction dredging was "likely to adversely affect" steelhead trout, but was "not likely to adversely affect" Lolo Creek bull trout. In a BA for Moose Creek, the Forest determined that suction dredging was "likely to adversely affect bull trout". In their respective 2004 Biological Opinions, NMFS and USFWS agreed with the Forest Service's determinations. Both agencies concluded that suction dredging would not jeopardize the continued existence of either species. Each agency's Opinion included incidental take statements[2] with non-discretionary reasonable and prudent measures to avoid or minimize take, and mandatory terms and conditions to implement those measures. In Chapter 2 of this EIS each agency's reasonable and prudent measures, terms and conditions, and recommendations discussed in the Forest's 2004 Biological Assessments for Lolo Creek and Moose Creek are consolidated into 30 specific conservation, and reasonable and prudent measures.

[2] Sections 4(d) and 9 of the ESA prohibit any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct) of listed species without a specific permit or exemption (NMFS, 2004 and USFWS, 2004).

1.3 Purpose and Need for the Proposed Action

The purpose and need answers the question "why" the proposed action is being considered. The purpose and need for the proposed action is to protect surface resources through the approval of acceptable mining Plans of Operations.

Purpose: Develop operating conditions and mitigations measures that protect surface resources, including threatened fish species, from impacts of suction dredging.

Need: Allow the Forest Service to approve, with no further environmental analysis, a limited number of Plans of Operations in specified reaches of Lolo Creek, Moose Creek, Independence Creek and Deadwood Creek.

Forest Service regulations found at 36 Code of Federal Regulations (CFR) 228.5 states that "a Plan of Operation will be analyzed by the authorized officer to determine the reasonableness of the requirements for surface resource protection." All mining proposals, including those submitted by small-scale suction dredge operators, are made under the authority of the United States mining laws (30 U.S.C. 21-45), which confer the statutory right to enter upon public lands for the purpose of exploration and development of mineral resources. The Clearwater National Forest received some Plans of Operation, and anticipates others of similar scale, from people proposing to use small-scale suction dredges to prospect, explore, and extract gold from instream gravels on and off placer mining claims in Lolo Creek and Moose Creek. The Forest Service is responsible to analyze these Plans of Operations and approve them, if the surface resource protection requirements found in these plans are reasonable.

The Forest Service has a responsibility to manage surface impacts from mining activities on National Forest System lands. Since miners have expressed a desire to continue mining on the Forest, the Forest Service initiated this environmental analysis, pursuant to mining regulations at 36 CFR 228.4 (f), to analyze the effects of suction dredging on resources and to develop mitigation measures to protect those resources. When included in Plans of Operation, these mitigation measures, along with necessary with State and Federal permits, will allow the Forest Service to approve the Plans of Operation. Approved Plans of Operation will allow up to 18 small-scale suction dredge operations in Lolo Creek and up to 38 small-scale suction dredge operations in Moose, Independence and Deadwood creeks.

1.4 Decision Framework

Given the Purpose and Need, the Forest Supervisor of the Clearwater National Forest is the responsible officer who will review the evaluation of alternatives and their potential environmental consequences. The Forest Supervisor will determine whether or not to approve suction dredge operations with an associated set of terms and conditions for those operations in designated areas of Lolo and Moose Creeks.

This decision will be implemented through approval of Plans of Operations which meet the requirements described in the selected alternative and Forest Service surface management regulations found in 36 CFR Part 228 Subpart A. These regulations do not provide for denying a reasonable Plan of Operation; reasonable plans of operations must be approved. Although this is non-discretionary, a Plan of Operation can be constrained or mitigated to protect surface resources. The constraints cannot make the operation economically infeasible, but may still significantly alter a miner's proposal as needed to protect surface resources or meet environmental laws, such as the

Clean Water Act and Endangered Species Act. Hence the decision to be made concerns approval of a set of resource protection measures that constitute one step in the approval process for plans of operation.

1.5 Laws, Regulations, Policies, and Plans

Forest Service mineral objectives are to manage National Forest System lands to accommodate and facilitate the exploration, development, and production of mineral resources, while integrating these activities with the use and conservation of other resources to the fullest extent possible.

Many laws, regulations, policies, and plans direct the Forest Service to support and facilitate mineral extraction while minimizing adverse environmental effects on National Forest resources and ensuring compliance with applicable environmental laws. The latter include, but are not limited to, the 1969 National Environmental Policy Act, 1972 Clean Water Act, the 1973 Endangered Species Act, and other laws described in chapter 5.

The ***Mining Law of 1872*** states that all valuable mineral deposits in land belonging to the United States are to be free and open to exploration. In order to make a discovery of a valuable mineral deposit, the operator has a right under the 1872 Mining Law to enter upon public lands open to mineral entry to prospect, and explore for mineral resources. The 1872 Law allows for mining claim location and possessory title to the valuable minerals within the location. While miners have rights under the 1872 Mining Law, they are legally required to comply with applicable laws passed since 1872 that have placed additional requirements upon miners. Many of these laws are described below. (See sidebar on page 1-8 for overview of mining claims).

Making Claims
Under the Mining Law of 1872

The General Mining Laws (most notably, the *Minin* *Law* of 1872) establish a policy for minerals development on Federal lands. In general, the law provides that persons are authorized to enter Fede lands and establish or locate a claim to a valuable mineral deposit. Once a claim has been properly located (and, since 1976, recorded with BLM), the claimant gains a possessory right to the land for purposes of mineral development. Mining claims a fully recognized private interests that may be trade sold. The possessory interest is considered private property subject to Fifth Amendment protection aga takings by the United States without just compensation.

There are several types of mining claims: lode, pla mill site, and tunnel. Suction dredge operations generally take place on unclaimed lands or on plac claims. Placer claims are located on deposits of lo unconsolidated material such as gravel beds, or on certain consolidated sedimentary deposits lying at t surface. There are few limitations on the exterior dimensions of a placer mining claim, but a single individual cannot locate more then 20 acres in each claim. An association of two owners may locate 40 acres, three may locate 60 acres, etc. up to a maximum of 160 acres in a single placer claim loca by eight or more persons. Corporations are limited 20 acres per claim.

The ***Organic Administration Act of 1897*** affirms the public's right to enter, search for, and develop mineral resources on lands open for mineral entry, and authorizes the Forest Service to approve and regulate all activities related to prospecting, exploring, and developing mineral resources.

The ***Multiple Use Mining Act of 1955*** directs that any mining claim located after July 23, 1955, shall not be used, prior to issuance of patent, for any purposes other than prospecting, mining or processing operations and uses reasonable incident thereto, and that such claims shall be subject to the right of the United States to manage and dispose of vegetative surface resources and to manage other surface resources, and the right of the United States, its permittees, and licensees, to use so much of the surface as may be necessary for such purposes or for access to adjacent land.

The ***Mining and Mineral Policy Act of 1970*** directs the Federal Government to foster and encourage private enterprise in the development of economically sound and stable industries, and in

the orderly and economic development of domestic resources to help assure satisfaction of industrial, security, and environmental needs.

The ***Federal Land Policy and Management Act of 1976*** (FLPMA) states that public lands will be managed recognizing the need for domestic sources of minerals. The *National Forest Management Act* required that the principals of land's multiple use and sustainable yield guide the management of National Forest System. The Forest Service was required to develop and implement a comprehensive Forest Plan to guide the management of each unit of National Forest System lands, including Clearwater National Forest (see below).

The ***National Environmental Policy Act*** (NEPA) is the nation's basic environmental charter, and requires that Federal agencies consider the environmental consequences of their actions. NEPA requires that a "detailed environmental statement" (that is, an Environmental Impact Statement or EIS) be prepared for "…major federal actions significantly affecting the quality of the human environment." The EIS must provide detailed information regarding the proposed action and feasible alternatives, the environmental impacts of the alternatives, potential mitigation measures, and any adverse environmental impacts that cannot be avoided if the proposal is implemented. Agencies are required to demonstrate that these factors have been considered by decision makers prior to undertaking actions. This EIS has been prepared in compliance with NEPA regulations promulgated by the Council on Environmental Quality (CEQ) (40 CFR 1500-1508) and with the Forest Service Manual.

The ***National Forest Management Act*** (NFMA) (16 U.S.C. 1600-1614) amended (and largely replaced) the Forest and Rangeland Renewable Resources Planning Act of 1974. NFMA required the Forest Service to assess National Forest System lands and develop a management program based on the principles of multiple use and sustained yield. The Forest Service also was required to develop and implement comprehensive Land Use and Resource Management Plans (which are known as LRMPs or "Forest Plans") for each unit in the National Forest System. These Forest Plans guide and coordinate multiple uses and the availability of lands for resource management. Plan development and implementation have to include:

- Interdisciplinary approach
- State and local coordination
- Public participation in planning process
- Multiple-use and sustained yield of products and services.

The ***Forest Service Surface Use Regulations*** (36 CFR Part 228 Subpart A – also known as the 228 Regulations) set forth rules and procedures for use of the surface of National Forest System Lands in connection with mineral operations both on and off mining claims. The regulations direct the Forest Service to prepare the appropriate level of environmental analysis and documentation when proposed operations may significantly affect surface resources. These regulations do not allow the Forest Service to deny entry or preempt the miners' statutory right granted under the 1872 Mining Law. The regulations require the Forest Service to develop mitigation measures to minimize adverse impacts on National Forest resources. The 228 regulations include requirements for reclamation.

The ***Forest Service Manual (FSM) 2800*** discusses specific responsibilities and considerations for dealing with a Plan of Operation. It states that the Forest Service should minimize or prevent adverse impacts related or incidental to mining by imposing reasonable conditions that do not materially interfere with operations.

The ***Clearwater National Forest Plan*** (USFS 1987) includes several Minerals Goals, Objectives, and Standards (pages II-3, II-7, and II-30). These goals, objectives and standards discuss the need to facilitate the orderly development of mineral commodities and provide for timely, reasonable, effective and economically feasible environmental protections. The Clearwater Forest Plan was amended by the Decision Notice/Decision Record, Environmental Assessment, and Finding of No Significant Impact for management of anadromous fish-producing watersheds on Federal Lands in eastern Oregon and Washington, Idaho, and portions of California in 1995 (PACFISH). The Forest Plan was also amended in 1995 by the Decision Notice and Finding of No Significant Impact for the Inland Native Fish Strategy for managing fish-producing watersheds in eastern Oregon and Washington, Idaho, Western Montana and portions of Nevada (INFISH). PACFISH and INFISH provide guidance and monitoring requirements for minimizing impacts to surface resources, especially in relationship to Riparian Habitat Conservation Areas (RHCAs). This EIS is tiered to PACFISH and INFISH plan and analysis document contents not in conflict with Forest Service locatable mineral regulations found at 36 CFR 228A.

Scope of the Analysis

This EIS evaluates the potential impacts of Clearwater National Forest approval of proposed plans of operations for small-scale suction dredge operations in sections of Lolo Creek, Moose Creek, and two tributaries of Moose Creek, Independence, Creek and Deadwood Creek, and of alternatives to this proposed action.

CEQ's NEPA regulations require that Federal agencies consider three types of actions to determine the scope of an EIS (40 CFR 1508.25).

Connected Actions are those actions that are closely related. Actions are connected if they automatically trigger other actions that may require environmental analysis; if they cannot or will not proceed unless other actions are taken previously or simultaneously; and if they are interdependent parts of a larger action and depend on the larger action for justification. There are no connected actions for purposes of this proposed action – Alternatives 2 and 3 contemplate approval of multiple plans of operations.

Similar Actions are those which, when viewed with other reasonably foreseeable proposed actions, have similarities that provide a basis for evaluating their environmental consequences together, but are not necessarily connected. For purposes of this EIS, Forest Service approval of multiple plans of action are considered to be similar actions. The analysis considers the approval of up to 18 plans of operations in Lolo Creek and up to 38 plans in Moose Creek, which are the maximum number the Forest Service believes could occur.

Cumulative Actions are those actions, which when viewed with other proposed actions have cumulatively significant impacts and therefore should be discussed in the same impact statement. This EIS considers the potential consequences of annual approval of up to 18 plans of operation in Lolo Creek and 38 plans in Moose Creek, which is a reasonable estimate of the maximum number of operations, and also considers other management actions in the area. Other past and reasonably foreseeable actions include a continuation of ongoing cattle grazing allotments, past and planned future timber harvest in the Lolo Creek study area, Lolo Creek campground reconstruction, and road modifications and maintenance in both study areas.

The regulations also require agencies to consider three types of *alternatives*: the No Action Alternative, the proposed action, and other reasonable courses of actions. The EIS identifies these alternatives in Chapter 2 and evaluates the potential impacts under each in Chapter 4.

In addition, agencies must consider three types of *effects* in EISs: direct, indirect and cumulative. The EIS discloses the direct, indirect and cumulative effects in Chapter 4. The cumulative effects analysis considered geographic boundaries of the effects; time frames (determining how far into the future to analyze cumulative effects); and past, present, and reasonably foreseeable future actions. The physical bounds of this analysis are the reaches of Lolo Creek, Moose Creek, Independence Creek, and Deadwood Creek described in Chapter 2 and the extent to which impacts may reach downstream or outside these areas.

In the context of administrative scope, this analysis: (a) is limited to the minerals-based proposed action, (b) is not a general management plan for Lolo Creek or Moose Creek, and (c) is the final NEPA documentation for future approvals of plans of operations that meet the terms and conditions of approval.

1.6 Summary of Scoping and Major Issues

On March 17, the Forest notified the Nez Perce Tribe of the imminent scoping and environmental analysis and initiated government-to-government consultations regarding the project. On March 21, 2003, the Forest mailed letters to all interested parties listed on the NEPA mailing list. The Forest published a notice in the *Lewiston Morning Tribune* on March 31, 2003. On April 4, 2003, Clearwater National Forest published in the Federal Register a Notice of Intent to prepare this EIS (65 FR 16465-16466). The Forest received comments from a total of 40 individuals and organizations. Comments ranged from criticism of the Forest Service for suggesting that any conditions could or should be placed on small-scale suction dredge operations, to support for the proposal, to opposition to all suction dredging.

On February 13, 2004, Forest Service representatives met with tribal fisheries, watershed, and wildlife specialists at the Bureau of Indian Affairs office in Lapwai, Idaho. A follow-up field review with Tribal water resource personnel was held on Lolo Creek on September 16, 2004.

The issues raised by individuals and organizations who submitted comments are shown in Table 1-1. The major issues, the ones that were used to develop or refine alternatives or to guide the evaluation of impacts, are identified in the table by bold italics. The issues addressed in this EIS resulted from public involvement efforts with individuals, citizen groups, environmental interest groups/organizations, industry, businesses, city and county governments, Federal and State agencies, and government-to-government consultation with the Nez Perce Tribe. Comments received from the public generated issues to be discussed in this document. The interdisciplinary team (ID team) reviewed and evaluated issues derived from this process to determine which issues were key issues. Certain issues were found to be non-relevant to the decision, since they are outside the scope of the proposal, already decided by law or policy, beyond the geographic influence of the proposal, or not affected by the proposal and alternatives (see Chapter Two for rationale). These included mining claim validity, declare streams as wild and scenic, withdraw streams from mineral entry, spill prevention containment and countermeasures plan, road construction and travelway improvements, systematic data collection system, reclamation bonding, and watershed analysis prior to approving suction dredging operations.

1.7 Availability of Project Files

An important consideration in preparation of this EIS has been the reduction of paperwork as specified in 40 CFR 1500.4. In general, the objective is to furnish enough site-specific information to demonstrate a reasoned consideration of the environmental impacts of the alternatives and how these impacts can be mitigated. More detailed information is in the project file in the District planning records and is available for public inspection. The reader may want to refer to the Clearwater Forest Plan and EIS (USFS 1987). The present EIS is "tiered" to the Forest Plan EIS and Record of Decision, as encouraged in 40 CFR 1502.20. Copies of the Forest Plan, Forest Plan EIS, and Record of Decision are available at libraries in the Clearwater National Forest locale and at the Forest Supervisor and Ranger District offices.

Table 1-1. Issues Raised During Scoping

Resource or Topic	Comment/Issue	Notes/Comments
Mining Law Issues	Forest Service has no authority to tell a miner how or where to mine. By doing so the Forest Service takes responsibility for the legal and financial status of the mining claim when it requires dredge sites to be located in areas of large substrate not preferred for spawning steelhead trout and bull trout.	This EIS would not itself proscribe or prescribe mining in any location or place restrictions on mining operations. Rather, it sets conditions under which this environmental analysis will cover the approval of a proposed Plan of Operations. If a Plan of Operation proposes other conditions, this EIS would not cover its approval, and a separate environmental analysis would be required.
	Several components of the proposed action were said to "materially interfere with mining" and possibly to constitute a taking These included: • Restricting the operating season • Prohibiting stream channel damming • Allowing only one dredge per 100 feet • No operation in gravel bars at tails of pools • Not allowing discharge of fine sediment to blanket gravel bars • Not allowing dredge operators to direct the stream current into the bank • Not allowing processing of stream bank materials • Not allowing moving large woody debris • Not allowing piling rocks • Requiring all holes be filled	

Table 1-1. Issues Raised During Scoping

Resource or Topic	Comment/Issue	Notes/Comments
	Mining claims must be "valid" under Mining Laws before mining can be approved/proceed	In order to prospect, explore, and make a discovery of a valuable mineral deposit or establish valid mining claims, the operator has a right under the 1872 Mining Law to enter upon national forests and to conduct upon those lands reasonable activities to prospect and explore for mineral resources. Exercise of this right does not require the staking of a mining claim, a fact recognized in the Forest Service locatable mineral regulations at 36 CFR 228.3(a), where mineral operations are defined and it is clearly stated that the Forest Service's regulations apply to all functions, work, activities, and uses reasonably incidental to all phases of mineral exploration & mining under the 1872 Mining Law, whether located on or off mining claims. While subject to regulation by the Forest Service under the 1897 Organic Act and the 1955 Surface Resources Act, miners still retain these general rights under the 1872 Mining Law.
	Activities must be reasonably incidental to and required for the particular stage of mining activity in which the operator is legitimately engaged	Forest Service agrees
Scope of Analysis Purpose and Need of EIS Alternatives	EIS too narrowly defined: it discourages alternatives that may be more likely to meet legal requirements, and standards and guidelines of Forest Plan as they pertain to RHCA's.	This EIS is focused on whether to approve plans of operations under specific conditions, not much broader management issues
Scope of Analysis Purpose and Need of EIS	One alternative should recommend withdrawal of all RHCAs, all potentially eligible streams for National Wild and Scenic Rivers, and all areas that contain special features	(See section 2.2)

Table 1-1. Issues Raised During Scoping

Resource or Topic	Comment/Issue	Notes/Comments
Alternatives	Each proposed action should be subject to public notice and individual NEPA analyses that cover cumulative impacts and site-specific impacts.	Purpose of this EIS is to evaluate impacts of multiple approvals, including cumulative impacts. Site-specific impacts are covered to the extent they may be unique. This environmental analysis will cover the approval of a proposed Plan of Operations under certain conditions. If a Plan of Operation proposes other conditions, this EIS would not cover its approval, and a separate environmental analysis would be required.
	The impacts on potential and candidate wild and scenic river corridors need to be addressed.	(See section 2.2)
	EIS for Nez Perce Tribal hatchery makes this EIS unnecessary	The hatchery EIS did not consider suction dredging
Water Quality and NPDES	A new point source discharge affecting a parameter associated with the 303 (d) listing is prohibited.	Lolo Creek is a 303 (d) listed stream. As long as term and conditions #1, #8 and #12 are complied with, there will not be a net increase in sediment as a result of suction dredging. Suction dredging removes existing sediment from the stream bottom, passes it through a sluice box and returns the sediment to the stream bottom resulting in no net increase in sediment. Will not violate state turbidity standards of 50 ntu. Turbidity will be monitored (condition #21).
	Clearwater Forest Plan agreement does not permit activities that would increase sediment in areas where Forest Plan water quality standards are not being met. These streams don't meet Forest Plan standards.	Increase in sediment and streams not meeting Forest Plan Standards are addressed in the analysis. (See sections 3.2.1, 3.2.3, 3.2.4.1, 3.3.3.1, 3.3.3.3)
	Forest Service cannot approve the project before the information and data necessary for NPDES permits have been obtained.	The Forest Service will not approve plans of operations unless they are covered by an NPDES permit.
Fisheries and Aquatic Resources	***Endangered Species Act Section 7consultation are needed for salmon, steelhead, and bull trout.***	The Forest Service agrees, and has fully complied with the Endangered Species Act.
	Forest Service duties under Endangered Species Act are not overridden by any "rights" the applicant may have under the 1872 Mining Law	
	EIS needs to provide high quality information that will indicate whether any past suction dredging operations resulted in damage to fisheries or fisheries habitat. Indicate areas where damage occurred and the year(s) if one or more operators did not perform required rehabilitation activities	Past effects of suction dredging and all other mining activities are included in the analysis. (See Section 3.2, 3.2.2, 3.3, 3.3.1)

Table 1-1. Issues Raised During Scoping

Resource or Topic	Comment/Issue	Notes/Comments
	What kinds of rehabilitation efforts are needed to restore fisheries and fisheries habitat?	Implementation of non-discretionary reasonable and prudent measures minimize adverse effects on designated salmonid habitat.
	Leaving some dredge holes would improve habitat (by giving fish deeper cooler water)	Leaving dredge holes would be contrary to NMFS' non-discretionary reasonable and prudent measures to minimize the likelihood of incidental take resulting from entrainment of eggs, fry, or juvenile Snake River steelhead in Lolo Creek.
Fisheries and Aquatic Resources	***Proposed terms and conditions for approval are inadequate because:*** • ***Many stream reaches are lacking in large wood needed for proper stream function.*** • ***Suction dredge mining can alter gravel suitable for steelhead, salmon, bull trout, and westslope cutthroat spawning.*** • ***Suction dredging or other streambed disturbing mining activities can cause the direct mortality of steelhead, salmon, bull trout and cutthroat eggs and developing alevins as well as resident trout, non-salmonid species and other aquatic species.*** • ***Suction dredge mining can impact other species, such as freshwater mussels.*** • ***Spawning gravels may be in short supply and may become a limiting factor if mining continues to degrade these important sites, which are relatively rare in some watersheds, or stream reaches.*** • ***Disturbance of the armoring layer adversely impacts immediate mining site and downstream gravels and redds*** • ***Many of these streams do not meet standards that reflect sediment such as cobble embeddedness.***	Used to help formulate the terms and conditions.
Hazardous Materials	***Dredge operators need to transport fuel in Department of Transportation approved tanks at quantities not to exceed 250 gallons.***	Used in formulation of a term and condition limiting transport of fuel to dredge to one gallon.
	A Spill Prevention, Containment, and Countermeasures plan should be required given the sensitive nature of this watershed.	The quantities of materials and the size of the operations do not meet reasonable thresholds for a SPCC Plan.
	Regularly inspected fire extinguishers need to be placed in all vehicles.	36 CFR 228.11 Prevention and control of fire. Requires operators to comply with all applicable Federal and State fire laws and regulations...
Vegetation	***Must cover impacts on threatened or endangered plant species and the spread of noxious weeds***	Analysis is included as part of the affected environment. (See section 3.2.6, 3.3.6.2, 4.9.2)

Table 1-1. Issues Raised During Scoping

Resource or Topic	Comment/Issue	Notes/Comments
Transportation	Cumulative impacts of the road system in the watersheds needs to be analyzed. DEIS needs to weigh whether it is justified (fiscally or ecologically) to allow additional roads, travelways or improvements, even if they seem incidental or minor, especially in RHCAs	No additional roads/ travelways/improvements are proposed or expected as a result of this action
Socioeconomics	***The net public benefit from this activity needs to analyzed in the DEIS. EIS should note that no revenue from mining accrues to the public.***	Although no revenues accrue to the United States, miners have argued that their suction dredging activities bolsters local economy through their purchasing of equipment, food, gas, etc. (See Section 3.2.10)
Recreation	***Suction dredge operations need to be set up in such a way as to not become a hazard to local tubers, swimmers, canoeists or other whitewater enthusiasts. Dredging operations should be kept away from developed campgrounds.***	Recreational analysis is included as part of the affected environment. (See Section 3.2.7)
Baseline Data	Baseline data must include past and present impacts of all types of mining, including collateral impacts such as that of access to mining claims, as well as other impacts such as roads, logging, water withdrawals and fire. Past off road vehicle (ORV) or 4 wheel drive trails or roads created by miners need to be documented in the analysis.	Baseline data include conditions as they exist. Discussion in the cumulative effects section takes into account those past actions that have contributed to current conditions.
	Systematic field investigations of each claim are needed to establish baseline conditions for monitoring future impacts.	Pre and post monitoring is required at each mine site along with 5 site visits per dredge site per season.
	EIS must develop photo documentation of existing conditions, habitat assessment and a GIS to help determine cumulative and site-specific effects. Many specific data layers were suggested.	EIS developed and used GIS mapping technology as appropriate
Monitoring	***Systematic field investigations of each claim are needed to correct activities that are clearly harmful and/or illegal***	A minimum of 5 site visits per dredge site per season will be a monitoring requirement.
	Monitoring effects of past dredging activities should be represented in the EIS.	Past effects of dredging and all other mining activities are included in the EIS. (See Section 3.2, 3.2.2, 3.3, 3.3.1)
Reclamation	***DEIS needs to describe the reclamation process and all associated costs in detail.***	Reclamation costs cannot be determined until after the pre-mining meeting with each individual operator. Bond amount will vary according to each operations planned disturbance. Forest Service Manual direction found at 2817.24 requires, prior to approval of a plan of operation, that the operator fumish a guarantee to perform reclamation work in an amount equal to the estimated cost of that work.
	Reclamation bonding should be required	FS policy found at FSM 2817.24 limits bonding to those with reclamation costs exceeding $200.

Table 1-1. Issues Raised During Scoping

Resource or Topic	Comment/Issue	Notes/Comments
	Reclamation should be concurrent with mining	Required State of Idaho mining BMP
	Analysis should include details on volume and type of material to be moved, equipment needed, location for stockpiling, and sequence for reclamation.	Inclusion of Forest Service costs is required under manual direction found at FSM 2817.24.
	Forest Service costs for reclamation should be included	Inclusion of Forest Service costs is required under manual direction found at FSM 2817.24.
Other	Mining operations on streams should be tracked with a systematic data collection system similar to that used for timber stands.	The number and size of operations on these streams does not justify an elaborate tracking system. Current records management is adequate for the level of tracking that is needed.
	Proposed operations should not be classed as mining...they are prospecting.	The Forest Service agrees in part that some "operators" are indeed prospecting. However, the efforts of many or most operators have elements of both prospecting and mining.
	The Forest Service must complete a watershed analysis prior to approving suction dredging operations	FS completes 1 watershed analysis per year. Lolo EAWS was completed in November 2003. Information in the Lolo EAWS is included in the analysis.

Note: Issues denoted in ***bold Italics*** contributed to or was accounted for in alterative selection and impact evaluation.

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2.0 Proposed Action and Alternatives

This chapter describes the alternatives selected for detailed consideration in the EIS and those eliminated from further consideration. The chapter also compares the features of the alternatives, identifies the preferred and environmental preferred alternatives, and summarizes the potential effects of each alternative that are described in detail in Chapter 4.

2.1 Alternatives Development Process

Section 1.7 in Chapter 1 described the issues that were raised during the scoping process and the major issues that were used to formulate alternatives and design the impact evaluation process. The IDT has considered three alternatives, including a "no action" alternative, which provides a reasonable range of alternatives [40 CFR 1502.14(a)]. Two alternatives are consistent with the purpose and need and the EIS, as described in Section 1.3 in Chapter 1, and were consistent with the Forest Plan and applicable laws and regulations. The three alternatives considered in detail are described in Section 2.1. Alternatives that were eliminated from further consideration are summarized in Section 2.2.

2.1.1 Alternative 1: No Action

The "no action" alternative is required by regulation in 40 CFR 1502.14(d). It is used, in part, to compare against the action alternatives to determine the effects of not implementing an action alternative. For purposes of this EIS, the No Action Alternative is defined as not approving proposed plans of Plans of Operations, Under this alternative, miners who submit Plans of Operations for suction dredging in Lolo Creek and Moose Creek would not receive approval for their plans of operations. No suction dredging would be allowed under the Mining Law or under any other authorization. This alternative could not be implemented under current law, including the Mining Law of 1872, and violates Forest Service regulations at 36 CFR 228A. However, this alternative provides a comparable environmental baseline against which to evaluate effects of the action alternatives. This is consistent with and legal under NEPA (40 CFR 1506.2(d)), which allows for analysis of alternatives that are not allowed under current law or regulations but that are valuable for exploring the range of effects.

Under this alternative, there would continue to be approximately the same level of traffic on Forest roads and approximately the same level of dispersed camping and other recreational activities.

2.1.2 Alternative 2: Proposed Action

Alternative 2 proposes to allow approval, with no further environmental analysis, proposed Plans of Operation in specified reaches of Lolo Creek and Moose Creek (including two tributaries, Independence Creek and Deadwood Creek) if the plan of operations includes specified operating conditions and mitigation measures as described below. The operating conditions and mitigation measures were derived from public comments, government-to-government consultation with the Nez Perce Tribe, and consultation with other government agencies (Appendix D). The maximum number of operations approved in any year under this analysis is assumed to be 18 for Lolo Creek and 38 for Moose Creek. These numbers correspond with the maximums listed in the USFWS and NMFS Biological Opinions (USFWS 2006 and NMFS 2006). Proposed operations exceeding the maximums will require reinitiation of consultation with USFWS and NMFS and separate environmental analysis. The areas in which plans of operations may be approved, and the active

mining claims on these areas, are shown in Figure 2-1 for Lolo Creek and Figure 2-2 for Moose Creek. The study areas are located as follows:

Lolo Creek

14 to 17 miles southeast of Pierce, Idaho,

in portions of:

- T. 34 N., R. 6 E., Section 5
- T. 35 N., R. 6 E., Sections 10, 16, 17, 20, 29, and 32, Boise Meridian.

All portions of the Lolo Creek study area border Clearwater County and Idaho County

Moose Creek
(and tributaries Deadwood Creek and Independence Creek)
Approximately 12 miles east of
Kelly Forks Work Center in portions of:

- T. 39 N., R. 11 E., Sections 4 and 9
- T. 40 N., R. 11 E., Sections 29, 31, 32, 33, Boise Meridian, Clearwater County, Idaho

The present terms and conditions (T&C) with which proposed plans of operations have to comply in order to qualify for approval under the proposed action are listed below. These terms and conditions include Idaho Department of Water Resources (2006) BMPs for suction dredging, USFWS (2006) and USFWS (2006) non-discretionary reasonable and prudent measures to avoid or minimize take. Also included are their mandatory terms and conditions to implement those measures. The Forest Service has added additional elements to some terms and conditions and also included additional conditions in response to concerns raised during scoping (Appendix D).

1. Operations may occur only below the ordinary high water line during a dredge season extending from July 1 through August 15.
2. Before dredge mining begins, operators must submit a Plan of Operations to the Forest Service that specifies the location, approximate amount of surface area they plan to dredge, and likely dates of operation. The operating plan would be used to establish channel-monitoring sites, and is not intended to constrain the timing and location of dredge operations.
3. Prior to dredging, operators must meet with a Forest Service fisheries biologist who will inspect the proposed dredge sites. No dredging will be allowed in areas of known bull trout (or steelhead, in the case of Lolo Creek) spawning or in areas identified as spawning habitat. Miners will also avoid identified lamprey spawning areas.
4. The suction dredge may have a nozzle diameter of 5 inches or less and a horsepower rating of 15 horsepower or less.
5. Intakes must be covered with 3/32-mesh screen.
6. Dredge sites must be located in areas of large substrate not preferred for spawning steelhead trout and bull trout, and operators are required to conduct all dredge mining 50 feet or more from identified spawning areas.
7. Dredging operations must take place during daylight hours.
8. Dredging must be conducted in a manner so as to prevent the undercutting and destabilization of stream banks, and may not otherwise disturb streambanks.
9. If streambanks are disturbed in any way, they must be restored to the original contour and revegetated with native species at the end of the dredging season.

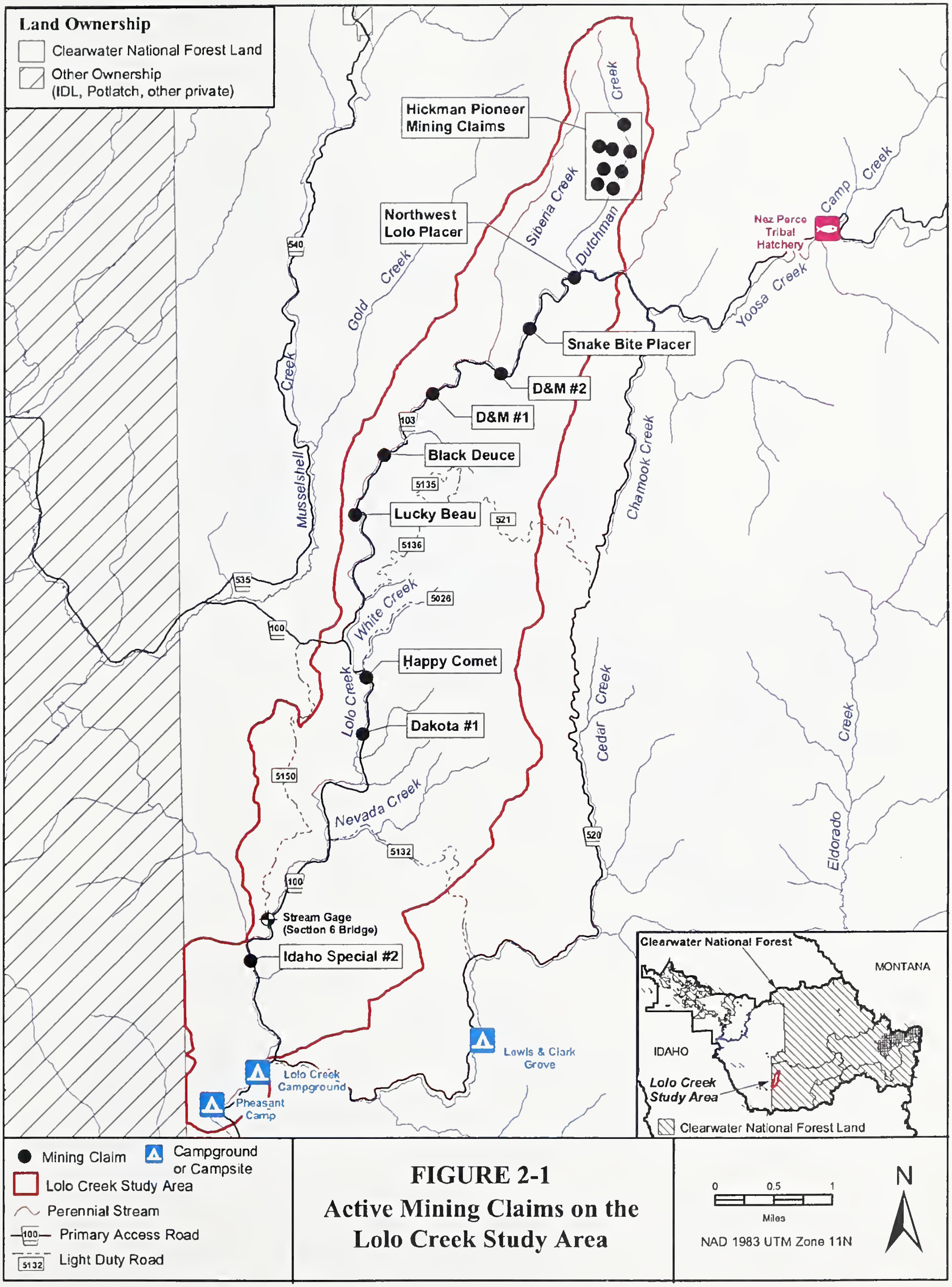


FIGURE 2-1
Active Mining Claims on the Lolo Creek Study Area

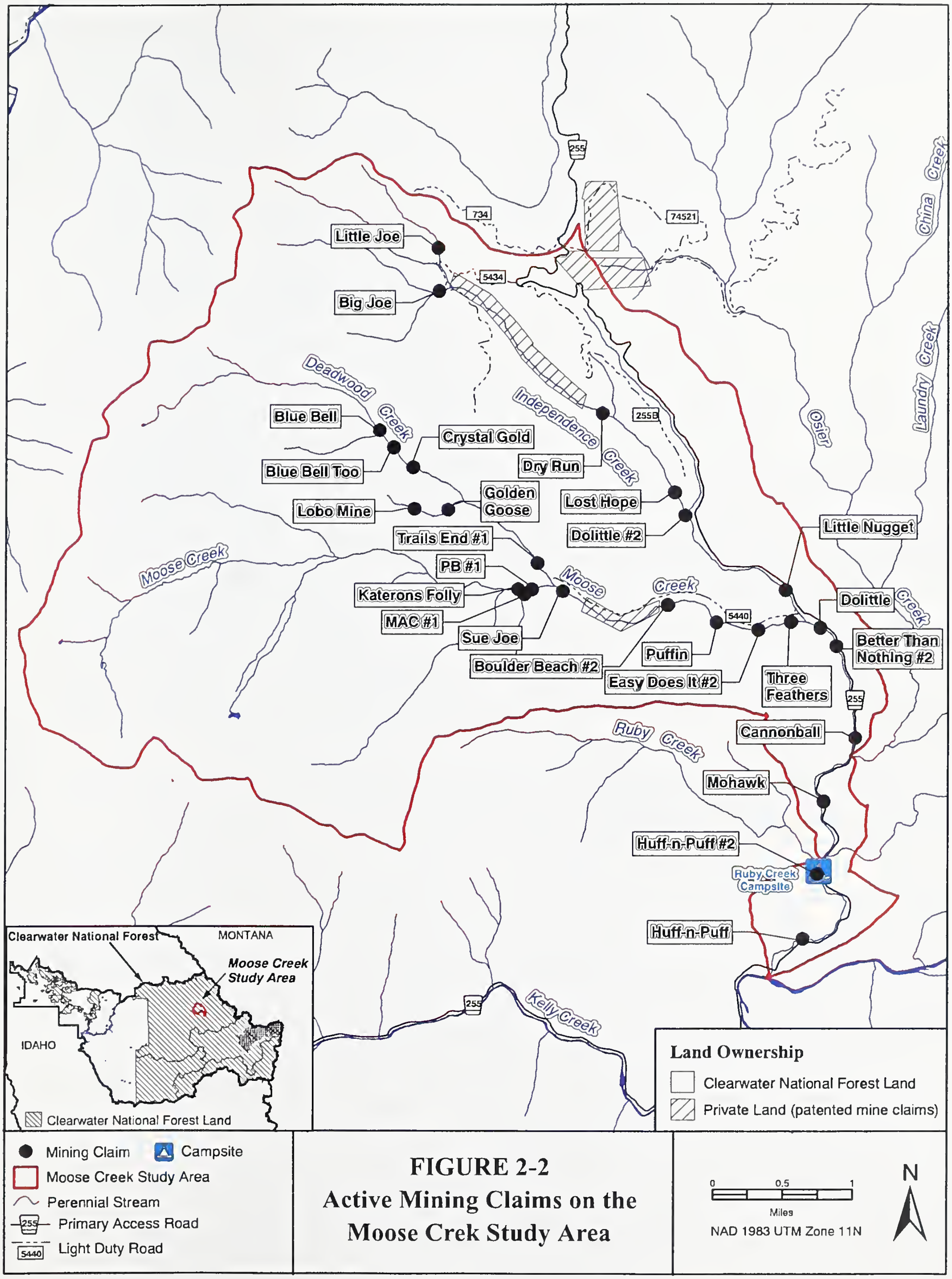


FIGURE 2-2
Active Mining Claims on the Moose Crek Study Area

10. Camping areas, paths, and other disturbed sites that are located along stream banks and that are associated with dredge operations must be revegetated or otherwise restored to their original conditions at the end of the dredge season.
11. Operators must cease activities during wet periods when project activities are causing excessive ground disturbance or excessive damage to roads.
12. Dredges must not operate in such a way that the current or the discharge from the sluice is directed into the bank in a way that causes erosion or destruction of the natural form of the channel, that undercuts the bank, or that widens the channel.
13. Operators may not undermine, excavate, or remove any stable woody debris or rocks that extend from the bank into the channel
14. Operators may not remove, relocate, or disturb stable in-stream woody debris or boulders greater than 12 inches in diameter.
15. The operator will not remove any large down or standing woody debris or trees for firewood within one tree length of the stream.
16. Operators may not move cobbles in the stream course to the extent that the deepest and fastest portion of the stream channel (the thalweg) is altered or moved.
17. No mechanized equipment may be operated below the mean high water mark except for the dredge itself and any life support system necessary to operate the dredge. No mechanized equipment other than the suction dredge may be used for conducting operations.
18. Dredging may not dam the stream channel.
19. Dredges may not operate in the gravel bar areas at the tails of pools.
20. Dredges may not operate in such a way that fine sediment from the dredge discharge blankets gravel bars.
21. Operators must visually monitor the stream for 300 feet downstream of the dredging operation after the first half hour of continuous operation. If noticeable turbidity is observed downstream, the operation must cease immediately or decrease in intensity until no increase in turbidity is observed 300 feet downstream.
22. Shallow areas must be restored to their original grade each day and natural pools may not be filled. Tailings must be redistributed to avoid creating unstable spawning gravels.
23. All dredge piles must be dispersed and backfill all dredge holes before moving to a new dredge location and by the end of the operating season, no later than August 15.
24. Dredging operations must shut down immediately if any sick, injured, or dead specimen of a threatened or endangered species is found. The finder must notify the Vancouver Field Office of NMFS Law Enforcement at (360) 418-4246. The finder must take care in handling sick or injured specimens to ensure effective treatment, and in handling dead specimens to preserve biological material in the best possible condition. The finder must also ensure that evidence intrinsic to the specimen is not disturbed unnecessarily. In addition, if any fish eggs are excavated or if destruction of redds is observed, operators must contact the Clearwater National Forest and receive authorization to proceed prior to resuming operations. Operators must record the date, time, location, and possible cause of fish injury or death.

25. Operators must maintain a minimum spacing of at least 100 linear feet of stream channel between suction dredging operations.

26. Gasoline and other petroleum products must be stored in spill-proof containers at a location that minimizes the opportunity for accidental spillage.

27. The suction dredge must be checked for leaks, and all leaks repaired, prior to the start of operations each day. The fuel container used for refueling must contain less fuel than the amount needed to fill the tank. The suction dredge must be anchored to the stream bank when refueling in the water, so that fuel does not need to be carried out into the stream. Unless the dredge has a detachable fuel tank, operators may transfer no more than one (1) gallon of fuel at a time during refilling. Operators must use a funnel while pouring, and place an absorbent material such as a towel under the fuel tank to catch any spillage from refueling operations. A spill kit must be available in case of accidental spills. Soil contaminated by spilled petroleum products, must be excavated to the depth of saturation and removed from the National Forest for proper disposal.

28. Operators will not entrain, mobilize, or disperse any mercury discovered during mining operations. Operators will ensure that all mercury discovered is removed from the stream and not disposed of on Forest Service Lands. Operators must cease operating at the site where the mercury was recovered and notify the Forest (USFWS, 2006).

29. All human waste must be kept more than 200 feet away from any live water. All refuse from dredging activities must be packed out and disposed of properly.

30. Operators must obtain all Idaho and Federal permits including the Environmental Protection Agency's NPDES permit, and the Corps of Engineers/State of Idaho's joint 404/ Permit to Alter a Stream Channel. Operators must also comply with any additional conservation measures stipulated in the permits, and must comply with the State of Idaho's Placer Mining - Best Management Practices (IDWR, 2004).

At the end of the operating season, no later than September 15, the operator must provide Clearwater National Forest a description of the actual location(s) of the operation, the surface areas dredged, and the number of days operated.
Other components of the proposed action, which also are based on terms and conditions required to implement the reasonable and prudent measures in the 2004 Biological Opinions, involve monitoring by the Forest Service and reporting to USFWS and NMFS. Specific monitoring and reporting that will be implemented by the Forest Service include the following:

1. The Forest Service will review all suction dredging applications for Lolo Creek prior to issuing any permits. The Forest Service shall determine if the extent and effects of the action are consistent with the BA (USFS 2006a), and if not, the Forest Service must reinitiate consultation immediately.

2. The Forest Service will include all terms and conditions in permits, grants, or contracts issued for the implementation of suction dredging operations.

3. Visit each recreational dredge site at least five times between July 1 and August 15, or more often if problems occur, to monitor dredge activity, and effects of the mining on fish and fish habitat.

4. Monitor potential changes in channel morphology as a result of mining through specific measures specified in the Biological Opinion.

5. Upon notice by an operator under item 24 above of dead or injured threatened or endangered species, or if eggs are excavated, the Forest Service will consult with NMFS Law Enforcement Office in the Vancouver Field Office, prior to authorizing a resumption of dredging.
6. Provide annual monitoring report to USFWS within 90 days of the end of the dredging season, and to NMFS by November 30 that describes operator compliance with suction dredging rules, the amount of stream area mined at each site, a photo of the mined area, and details about stream bank disturbance and revegetation, if any.
7. Provide NMFS and USFWS with an update of pre-season monitoring no later than June 15, and a report on post-season monitoring progress no later than September 15.

Under this proposed action, a claimant or operator would submit to the District Ranger a proposed Plan of Operations that included all 30 of the terms and conditions above. All 30 terms and conditions apply to both Lolo Creek and Moose Creek. The proposed plan would provide site-specific information sufficient for the District Ranger to determine that the terms and conditions would be adequate for protection of surface resources on that specific site.

If the District Ranger determines that the proposed Plan of Operations meets the conditions described above and they sufficiently minimize impacts to and protect surface resources on that site, the Plan of Operations could be approved with no further environmental analysis. If the Ranger determines that the Plan of Operations does not meet these conditions, the District Ranger would not approve the Plan of Operations pending revisions to the plan or completion of a separate environmental analysis on that plan. Any separate environmental analysis would require a separate Endangered Species Act Section 7 consultation with USFWS and/or NMFS.

Each approved Plan of Operations would be in effect for the duration of the operating season, as long as the operation is conducted within the terms and conditions.

2.1.3 Alternative 3: Suction Dredging and Stream Improvement Projects

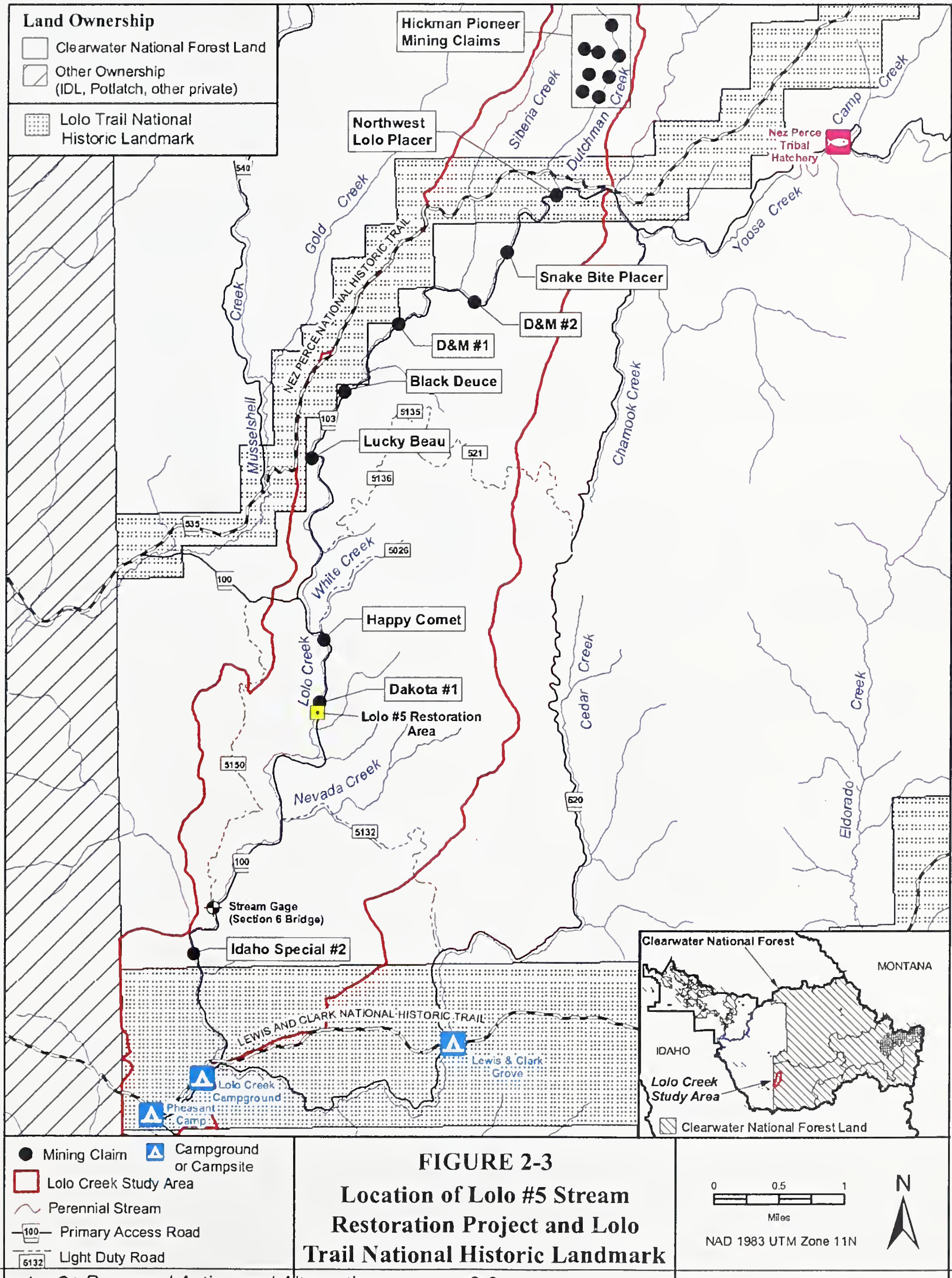
This alternative is the same as alternative 2, except that it includes two specific stream improvement projects. Alternative 3 is the preferred alternative.

The first project involves bank stabilization and reclamation of the abandoned Lolo #5 mining claim on Lolo Creek (see Figure 2-3). Lolo #5 was placer mined by backhoes and dozers in the late 1970s, and the site was never reclaimed. The overburden and placer tailings bermed along the west bank of the creek have remained unstable and continue to be a major contributor of fine sediment to the stream system (Clearwater BioStudies, 1999a). The mitigation project would stabilize and reclaim approximately 950 feet of Lolo Creek, and would include the following components:

- Remove and/or recontour sediment producing overburden and tailings berm.
- Armor, and revegetate with native species as needed to provide a stable non-erodable stream bank along the west bank of Lolo Creek.
- Recontour and revegetate as needed existing overburden and tailings stockpiles away from existing emergent wetlands.

The restoration project would not take place during critical salmonid spawning or migration periods and would follow all appropriate construction Best Management Practices (IDL, 1992) to control erosion and minimize short-term impacts due to construction.

Figure 2-3. Location of Lolo #5 Restoration Project and Lolo Trail National Historic Landmark



The second project would involve installation of a fish-friendly drainage device or ford where there is now an unimproved ford where Forest Road 5440 crosses Independence Creek (see Figure 2-4). Road 5440 is a native surfaced local Forest road used to access the mining claims along Moose and Independence Creeks. The present Independence Creek crossing is a ford that is a potential fish barrier during low flows and also a source of sediment to downstream Independence Creek and Moose Creek. As with the Lolo Creek stream restoration project, the Independence Creek project would not take place during critical salmonid spawning or migration periods and would follow all appropriate Best Management Practices (IDL, 1992) to minimize short-term impacts due to construction.

The Lolo Creek and Moose Creek projects are not connected actions related to suction dredging. Completion of the two projects is dependent upon available funding. At sometime in the future, if sufficient funds are made available, either or both projects can be implemented.

2.2 Alternatives Eliminated from Detailed Consideration

Several alternatives were suggested during public scoping or otherwise identified by the Interdisciplinary Team, but then eliminated from further consideration. These alternatives, and the reason they were eliminated, include:

- *Withdrawal* of all Riparian Habitat Conservation Areas, all potentially eligible streams for National Wild and Scenic Rivers, and/or all areas that contain special features. This was based on a scoping comment (see Chapter 1). Withdrawn lands are closed to mineral entry under the mining laws. This alternative was not carried forward because it is not consistent with the Purpose and Need, as described in Chapter 1, the Forest Plan, and the Mining and Mineral Policy Act (see section 5.2.3).
- *Complete a separate NEPA analyses* for each small-scale suction dredging operation in these creeks. This alternative was not carried forward because small-scale suction dredging in Lolo Creek and Moose Creek are similar actions with similar impacts and similar cumulative effects (see page 1-9). This EIS evaluates the impacts of multiple operations, so the potential impacts identified in the EIS would be inclusive of the impacts of each single operation, and so this EIS considers all the impacts that a series of operation-specific NEPA analyses would evaluate. This EIS is a much more efficient means of identifying and disclosing impacts than would be multiple environmental assessments or an EISs analyzing small-scale suction dredging. In addition, the Forest Service notes that Alternatives 2 and 3 being evaluated in this EIS is not the approval of proposed plans of operations; rather, they would allow the District Ranger to approve proposed plans of operation if the District Ranger determined that the 30 terms and conditions to which the operator would have agreed would protect surface resources on that site of the operation.
- *Longer or shorter mining seasons*. A longer mining season could intrude on the period before July 1 in which juvenile steelhead would be affected and the time that bull trout move upstream to spawn in late August and September. This would be inconsistent with the reasonable and prudent measures specified by NMFS and USFWS and could result in a taking and other unacceptable impacts to these species. Suction dredge operators typically do not work every day and dredge 4-6 hours per day during the July 1 to August 15 dredge season. If the season were shortened, the dredge operators would increase the number of days and number of hours of operation. A shorter mining season, therefore, would

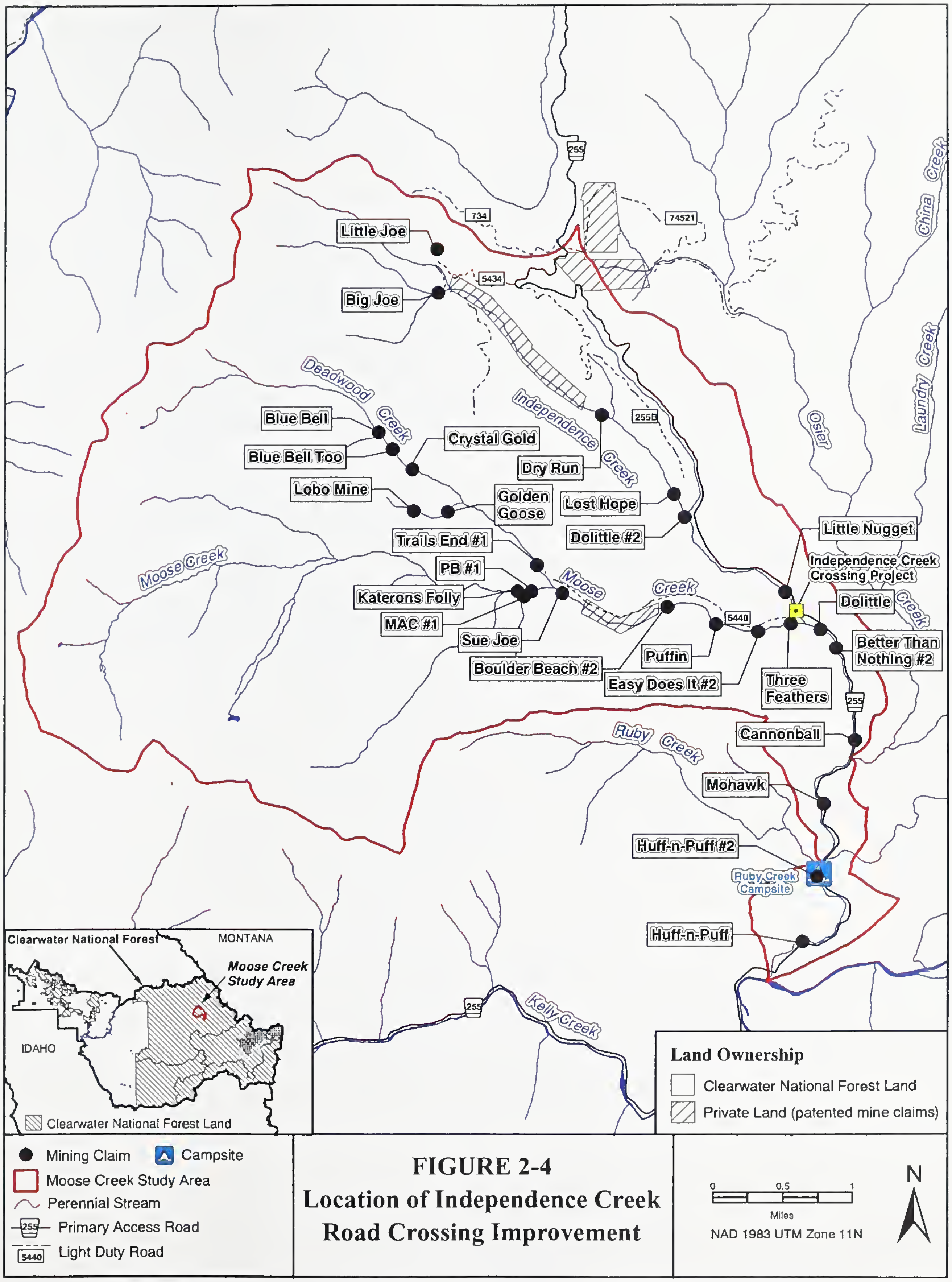


FIGURE 2-4
Location of Independence Creek Road Crossing Improvement

not result in significantly reduced impacts and would provide no additional protection to threatened or endangered salmonid species.

- *Approve operation only when validity is proven under the mining laws.* This suggested alternative was rejected because it is inconsistent with Forest Service policy and regulations. The Forest Service Policy on Mining of Public Domain Mineral Estate (USFS 2003g) states "On National Forest system lands reserved from public domain and open to entry under the Mining Law, the Forest Service is not required to inquire into claim validity before processing and approving proposed plans of operations." In order to prospect, explore, and make a discovery of a valuable mineral deposit or establish valid mining claims, the operator has a right under the 1872 Mining Law to enter upon national forests and to conduct upon those lands reasonable activities to prospect and explore for mineral resources. Exercise of this right does not even require the staking of a mining claim, a fact recognized in the Forest Service locatable mineral regulations at 36 CFR 228.3(a), where mineral operations are defined and it is clearly stated that the Forest Service's regulations apply to all functions, work, activities, and uses reasonably incidental to all phases of mineral exploration & mining under the 1872 Mining Law, whether located on or off mining claims.

2.3 Comparison of Potential Effects of Alternatives

This section provides a summary of the potential effects to each resource that would result from implementation of each alternative considered in detail. Table 2-1 summarizes the findings in Chapter 4 for each alternative in Lolo Creek and Moose Creek, respectively, and allows a comparison of potential impacts among the alternatives.

Table 2-1. Summary and Comparison of Potential Impacts of Proposed Action and Alternatives

Resource Area	*Potential Impacts Unique to Alternative(s)*			*Mitigation Measures (under Alternative 2, except as noted)*[3]
	Alternative 1: No Action	*Alternative 2: Proposed Action*	*Alternative 3: Stream Improvement Projects*	
Hydrology and Stream Discharge	- No effect on streamflow or water yield - Continued elevated sediment yield from Lolo #5 area and Independence Creek 5440 road crossing	- Same as Alternative 1	- No effect on streamflow or water yield - Short-term increase in sediment yield during construction projects - Long-term decrease in sediment yield from Lolo #5 project area - Long-term decrease in sediment yield from road 5440 crossing of Independence Creek	- Erosion controls and other construction BMPs under Alternative 3
Stream Geomorphology	- Lolo #5 stream bank would remain unstable - Scouring and erosion would continue where road 5440 crosses Independence Creek	- Same as Alternative 1	- Same as Alternative 2, except: - Increase bank stability from restoration in Lolo #5 area - Elimination of scouring/erosion at Independence Creek crossing	- No dams allowed (18) - No moving/removal of woody debris or boulders (13, 14) - No deflection of ~~flow~~ into bank (12) - No undercutting or destabilization of banks (8) Displaced material must be replaced (23)
Water Quality	- Minimal impacts from casual visitors and campers - Continued increased sediment/turbidity in Lolo #5 area and downstream of Independence Creek/5440 crossing	-Same as Alternative 1	- Same as Alternative 2, except: - Short-term increase in sediment/turbidity in and downstream of project areas during construction - Long-term decrease in and downstream of Lolo #5 and downstream of Independence/5440 crossing	- Refuse and human waste >200 feet from stream (29) - Fuels must be properly stored and used (26 and 27) - No gold recovery using hazardous or refined substances (28) - Stop operations of mercury encountered (28) - Operators must visually monitor after startup, must stop if turbidity visible over 300 feet downstream regardless of the spacing of operators (21) - USFS will monitor repeatedly during operations - Erosion controls under Alternative 3 - No dredging outside channel (1)

[3] Numbers in parentheses refer to the conditions, described in section 2.1.1 in Chapter 2, to which an operator must agree to comply before the Forest Service would approve the proposed Plan of Operation.

Table 2-1. Summary and Comparison of Potential Impacts of Proposed Action and Alternatives

Resource Area	Potential Impacts Unique to Alternative(s)			Mitigation Measures (under Alternative 2, except as noted)[3]
	Alternative 1: No Action	*Alternative 2: Proposed Action*	*Alternative 3: Stream Improvement Projects*	
Fisheries	- No significant effects: recreational fishing may take individual fish	- Dislocation of aquatic insects could cause short-term attraction fish to dredge area - Reduction in aquatic invertebrates would reduce food supply in dredged area until recolonization occurred - Excavating pools could cause localized area of lower temperature, which could attract fish - Fine sediment could irritate gills - Fine sediment could reduce habitat quality by filling interstitial spaces in substrate that are used by juveniles and reducing benthic invertebrate prey	- Same as Alternative 2 - Fish in Lolo #5 area would be dislocated during construction projects - Fish immediately downstream of Independence Creek project may avoid area during construction - Improved crossing will improve fish passage during base flow	- Limited spawning habitat in study areas - Dredging season limited to July 1 to August 15 to minimize impacts to juveniles/larvae, occurs after bull trout and steelhead emerge from substrate (1) - Allowed only in areas of large substrate not preferred by spawning steelhead and bull trout (6) - No dredging in spawning habitat, as determined by UISFS inspection (3) - Intakes must have 2/32 screen (5) - Excavated pools must be filled at end of season (23) - No filling natural pools (22) - Operation may not blanket sediment bars (20) - May not operate in gravel bar areas at end of pools (19) - Fuels must be properly stored and used (26 and 27)
Instream Habitat	- Negligible	- Prior to reclamation, pool will be created in substrate and tailing piles will be created downstream.	- Same as Alternative 1, except long-term improvement in habitat due to more natural stream channel and riparian area	- No dams (18) - Dredge piles have to be broken down (23) - May not disturb streambanks (8, 9, and 10) - Minimum of 100 feet between operations (25) - No moving woody debris or large rocks (13, 14) - Large rocks have to be replaced by end of season (23) - Redistribute tailings to avoid creating unstable spawning gravels (22)

Table 2-1. Summary and Comparison of Potential Impacts of Proposed Action and Alternatives

Resource Area	*Potential Impacts Unique to Alternative(s)*			*Mitigation Measures (under Alternative 2, except as noted)* [3]
	Alternative 1: No Action	*Alternative 2: Proposed Action*	*Alternative 3: Stream Improvement Projects*	
Aquatic Invertebrates	- No effect on aquatic invertebrates	- Some downstream displacement of aquatic invertebrates, minimal injury or mortality to aquatic insects - Disturbance/disruption could cause temporary abundance of dislodged aquatic insects - Reduced abundance of benthic invertebrates after dredging - Fine sediment could fill interstices in gravel/cobble, reducing habitat	- Same as Alternative 2 - Aquatic invertebrates in Lolo #5 project site would be disturbed, dislocated, or killed - Sediment downstream of construction equipment at both projects may irritate gills or fill interstices, reducing habitat	- Most benthic species can recolonize within week - Sediment would likely be scoured in next high flow, allowing recolonization - Mitigation described under Water Quality will mitigate effects of sediment
Wildlife	- Minimal effects - Wildlife would avoid active campsites and roads - Seasonal hunting would kill/injure isolated game animals	- Same as Alternative 1 - Pump/compressor noise may cause wildlife to avoid riparian areas in daylight hours	- Same as Alternative 2 - Heavy equipment noise would cause wildlife to avoid project areas during operations	- Amphibians' preferred habitat and egg-laying area is along/under stream banks, which may not be may not be dredged (8)
Riparian Vegetation and Wetlands	- Some trampling by casual visitors and campers	- Some trampling during access to stream channel	- Same as Alternatives 1 and 2 - Equipment access and site reclamation will impact riparian vegetation along the west bank of Lolo#5 and around wetlands. - No impacts are expected to riparian vegetation adjacent to wetlands during construction	- Wetlands delineation at Lolo #5 before Alternative 3 implemented. - Design will incorporate jurisdictional wetlands and construction BMPs will minimize disturbance - USFS regulations control brush clearing and tree cutting.... Endangered Species Act modeling showed the watersheds in which the proposed project is located did not contain suitable habitat for the three federally listed plants. - Any disturbed stream bank must be revegetated.

Table 2-1. Summary and Comparison of Potential Impacts of Proposed Action and Alternatives

Resource Area	*Potential Impacts Unique to Alternative(s)*			*Mitigation Measures (under Alternative 2, except as noted)* [3]
	Alternative 1: No Action	*Alternative 2: Proposed Action*	*Alternative 3: Stream Improvement Projects*	
Threatened & Endangered Species	- No significant effects: recreational fishing may take individual fish	- See Fisheries for potential effects on T&E fish - *Fall-run chinook salmon:* no effect in Lolo, not present in Moose Creek - temporary localized peaks in macroinvertebrate availability immediately after disturbance. Thereafter, localized reductions in macro-invertebrate availability until recolonization. - *Steelhead trout*: In Lolo Creek, short-term displacement and dislocation, temporary reduction in macroinvertebrate prey. Steelhead not present in Moose Creek - *Bull trout:* Some fry may have short-term dislocation or disturbance. Some reduction in invertebrate prey.	- Same as Alternative 2 - Disturbance and dislocation in Lolo #5 project area, possibly some injuries or mortality, during construction season. - Improved habitat at Lolo #5 - Access by fish to Independence Creek above road 5440 during base flow	- USFS biologist inspects before mining. If area has known spawning or is spawning habitat, no mining (3) - Chinook: July 1 to August 15 dredge season is after previous-year offspring are out of gravel and before most spawning begins. (1) - Steelhead: July1 to August 15 season is after spawning and after most steelhead emerge from substrate before season opens (1) - Bull trout: July 1 to August 15 season -- fry should have emerged from gravel before season - Must dredge in areas of large substrate not preferred by steelhead and bull trout (6) - No operations in gravel bars at tails of pools (19) - Operations may not blanket bars with sediment (20) - Shut down and contact USFS if eggs are excavated; sick, injured, or steelhead or bull trout are observed; or if redd destroyed (24) - Shut down if bull trout observed in either creek or if steelhead observed in Lolo Creek, until fish move out of range - USFS will monitor operations at least 5 times during season
Wildlife	- Minimal effects - Wildlife would avoid active campsites and roads - Seasonal hunting would kill/injure isolated game animals	- Same as Alternative 1 - Pump/compressor noise may cause wildlife to avoid riparian areas in daylight hours	- Same as Alternative 2 - Heavy equipment noise would cause wildlife to avoid project areas during operations	- Amphibians' preferred habitat and egg-laying area is along/under stream banks, which may not be may not be dredged (8)

Table 2-1. Summary and Comparison of Potential Impacts of Proposed Action and Alternatives

Resource Area	*Potential Impacts Unique to Alternative(s)*			*Mitigation Measures (under Alternative 2, except as noted)* [3]
	Alternative 1: No Action	*Alternative 2: Proposed Action*	*Alternative 3: Stream Improvement Projects*	
Riparian Vegetation and Wetlands	- Some trampling by casual visitors and campers	- Some trampling during access to stream channel	- Same as Alternatives 1 and 2 - Equipment access and site reclamation will impact riparian vegetation along the west bank of Lolo#5 and around wetlands. - No impacts are expected to riparian vegetation adjacent to wetlands during construction	- Wetlands delineation at Lolo #5 before Alternative 3 implemented. - Design will incorporate jurisdictional wetlands and construction BMPs will minimize disturbance - USFS regulations control brush clearing and tree cutting.... Endangered Species Act modeling showed the watersheds in which the proposed project is located did not contain suitable habitat for the three federally listed plants. - Any disturbed stream bank must be revegetated.
Recreation	- Change in, and possible decrease in, recreation use if no suction dredging allowed	- Daylight noise may cause nonmining recreationists to avoid areas near active operations - Hikers on Lolo National Historic Trail may hear engines as they pass near operations; this could last 30 minutes or more, depending on hiking speed, wind, and other factors.	- Same as Alternative 2 - Mining noise may cause recreationists, including suction dredge operators, to avoid project areas during construction	- Highest noise levels in daytime, which is when ambient (wind) and human noises (traffic, aircraft) are highest. This could serve to mask noise from suction dredging or stream improvement projects.
Visual Resources	- Some campsites may be visible from trails	- Same as Alternative 1 - Some operations may be visible from Lolo National Historic Trail - Some mining operations may be visible from roads.	- Same as Alternatives 1 and 2 - Construction operations would be visible from roads	

Table 2-1. Summary and Comparison of Potential Impacts of Proposed Action and Alternatives

Resource Area	*Potential Impacts Unique to Alternative(s)*			*Mitigation Measures (under Alternative 2, except as noted)* [3]
	Alternative 1: No Action	*Alternative 2: Proposed Action*	*Alternative 3: Stream Improvement Projects*	
Noise	- Motorized camper generator noise near campsites - Noise from traffic on roads	- Same as Alternative 1 - Suction dredge pumps/compressors would generate noise, could be audible at 100m or more during daylight hours	- Same as Alternatives 1 and 2 - Construction equipment would generate noise, could be audible for 100m or more during operations	- Suction dredges may operate only during daylight hours (7)
Socioeconomics	- Negligible	- Negligible	- Negligible	None
Heritage Resources	- Minor potential: visitors or campers could encounter and disturb artifacts, old cabins, or other potential resources	- Same as Alternative 1 - Operators could encounter and disturb artifacts or other resources in the streams	- Same as Alternatives 1and 2 - Reclamation of Lolo #5 could encounter artifacts or other resources buried in the tailings or overburdened piles - Installation of new crossing at Independence Creek may encounter or disturb artifacts or other resources in stream.	- USFS has surveyed the Lolo and Moose Creek Project Areas and has consulted with SHPO - USFS rules require that work be stopped if artifacts encountered, and USFS archaeologist notified. - Construction projects will be monitored by archeologist during excavation phases.
Native American treaty rights and traditional uses				
Fishing	- Negligible. Tribal and other fishing would continue as at present. - Presence of non-tribal members may be less than optimal climate.	- Same as for Alternative 1 - For impacts on salmon, see above under Fisheries and T&E Species. In general, minor to negligible effects expected.	- Same as Alternatives 1 and 2 - Reclamation of Lolo #5 impacts on salmon, see above under Fisheries and T&E species. In general, minor to negligible effects expected. - Removal/improvement of Independence Creek ford would allow fish passage during low flows	- USFS has initiated contact with Nez Perce Tribe to identify other impacts to tribal fishing - See measures under Fisheries and T&E rows above.
Hunting	- Negligible. Tribal and other hunting would continue as at present. - Presence of non-tribal members may be less than optimal climate	- Same as Alternative 1. - Game animals would avoid riparian corridors due to noise in daylight hours and human presence at more extended times.	- Same as Alternatives 1 and 2 - Game animals would avoid project areas during reclamation when heavy machinery and humans were present.	- USFS has initiated contact with Nez Perce Tribe to identify other impacts to Tribal hunting - Dredging season would end before prime hunting season

Table 2-1. Summary and Comparison of Potential Impacts of Proposed Action and Alternatives

Resource Area	*Potential Impacts Unique to Alternative(s)*			*Mitigation Measures (under Alternative 2, except as noted)* [3]
	Alternative 1: No Action	*Alternative 2: Proposed Action*	*Alternative 3: Stream Improvement Projects*	
Gathering	- Negligible. Tribal and other gathering would continue as at present - Presence of non-tribal members may be less than optimal climate	- Same as under Alternative 1. - Could cause indirect effects (noise, for example) to adjacent Tribal gathering area	- Same as under Alternative 2. - Machinery could disturb gatherers and could affect adjacent Tribal gathering areas.	- USFS has initiated contact with Nez Perce Tribe to identify other impacts to Tribal gathering.

3.0 Affected Environment

This chapter describes the existing environmental resources of the project areas, with emphasis on the conditions in the human and natural environment that may be affected by the project alternatives.

3.1 Physical Setting and Climate

Clearwater National Forest is located on the west side of the Bitterroot Mountains in north central Idaho (Figure 1-1). Forest Headquarters are in Orofino, Idaho. The Forest is divided into four Ranger Districts: North Fork District, with offices in Orofino; Lochsa District with offices in Kooskia; Palouse District, with offices in Potlatch; and Powell District, with an office at Powell Ranger Station 44 miles west of Lolo, Montana. The Lolo Creek study area is within the Lochsa Ranger District, while the Moose Creek study area is within the North Fork District.

The Forest encompasses approximately 1.8 million acres of diverse terrain, landscapes, and vegetation. Nearly a million acres are currently roadless and another quarter million acres are designated wilderness.

Clearwater National Forest is characterized by rugged, mountainous terrain, high mountainous lakes, and streams. The high mountains on the east descend to the Palouse prairie to the west. Elevations range from 1,600 to nearly 9,000 feet. The landscape within the Forest displays a wide variety of landforms including steep canyon breaklands, low relief rolling hills, colluvial midslopes, frost churned uplands, mass wasted areas, and alpine glaciated areas (Wilson, 1983).

Several major tributaries to the Clearwater River flow through the Forest, including the North Fork of the Clearwater, the Lochsa, the Potlatch and the Palouse Rivers. The Clearwater River runs through deep canyons, dramatic "slashes" cut through the mountains.

The area's climate is dominated by Aleutian Low and Pacific High maritime air masses and prevailing westerly winds. Aleutian Lows that are prevalent in winter bring periods of heavy precipitation as snow and spring rains. Rain-on-snow events are common, and these can cause flooding. Pacific Highs in summer cause hot, dry weather. Precipitation during summer often occurs as short-term, high intensity thunderstorms. Average annual precipitation in the Lolo Creek watershed is about 40 inches per year with over half the annual precipitation contributing to stream flow. Average annual precipitation in the Moose Creek watershed is approximately 54 inches per year (USFS 1991).

Most precipitation in both watersheds occurs in the fall, winter, and spring. Weather varies with elevation. Summers tend to bring clear days, with occasional afternoon thunderstorms. Daytime highs are normally warm to moderate, with relatively cool to cold nights, depending on elevation. Winter can bring cold temperatures with heavy snows, especially at the high elevations. Sunny days are common between winter storms.

Bedrock within the Forest is predominantly Belt series metasedimentary rocks, Border Zone and Western Idaho Suture Zone metamorphic rocks, Idaho Batholith granitics, and Columbia River Basalts (Mitchell 1996). Soils produced from these parent materials vary in thickness and erodibility. Much of the area is capped with volcanic ash produced by the eruption of Mount Mazama (Crater Lake) about 6,700 years ago (Wilson 1983).

3.2 Lolo Creek

3.2.1 Watershed Description

Lolo Creek is a major tributary to the Clearwater River. The confluence is located near Greer, Idaho (see Figure 1-1 in Chapter 1). The Lolo Creek watershed covers 243 square miles, with 42 square miles above Musselshell Creek (USFS 2003a) and approximately 14.2 square miles within the EIS project area. The watershed ranges in elevation from 1,098 feet at its mouth to 2,775 feet at the U.S. Forest Service Boundary, to 6,051 feet at its headwaters (Clearwater Biostudies, Inc. 1998). Within the study area, the headwaters of tributary Dutchman Creek are at about 4,300 feet, and Lolo Creek descends to about 3,400 feet where it flows out of the study area to the east.

Tributaries within the Lolo Creek project area include Nevada Creek, Mike White Creek, White Creek, Utah Creek, Siberia Creek, and Dutchman Creek. Intermittent streams are rare as most streams are perennial that emerge near ridges. The drainage density within the Lolo Creek watershed is 4.1 miles of stream per square. The Lolo Creek drainage above Musselshell Creek has had timber harvested on 42 percent of the area since 1954. About 218 miles of roads have been constructed, creating an average density of 5.2 miles of road per square mile. Grazing allotments have been managed on approximately 20 percent of the watershed, primarily at the lower elevations, and past wildfires have occurred on 3,800 acres, approximately 47 percent of the watershed (USFS 2002c).

The State of Idaho has designated the Clearwater River as having several beneficial uses, including domestic water supply, cold-water biota, salmonid spawning, primary contact recreation, and special resource waters (IDEQ 2000). The State has not listed specific beneficial uses for Lolo Creek. The Forest Plan identifies steelhead trout and cutthroat trout as the beneficial uses for the Lolo Creek watershed (USFS 1987).

The Idaho Department of Environmental Quality has determined that many streams across the State do not support their designated beneficial uses due to their inability to meet applicable water quality standards. From its source to Yakus Creek, which is within the project area, the State identified Lolo Creek as having water quality concerns from bacteria, nutrients, sediment, and temperature on their EPA approved 2002 303(d) list (IDEQ 2005). Under the Clean Water Act (CWA), finalization of the proposed listing required that a Total Maximum Daily Load (TMDL) be prepared for Lolo Creek. A TMDL ultimately establishes a scientifically-based-strategy for correcting the impairment and restoring the water body to designated uses. Under the development of a TMDL for Lolo Creek, permits under the National Pollutant Elimination System (NPDES) for suction dredging operations will be required to comply with all load allocations specified in the TMDL.

There are approximately 24.7 miles of perennial streams within the Lolo Creek study area, with Lolo Creek itself running for 11.6 miles through the area. Parts of Lolo Creek were placer mined in the 1970s and early 1980s with heavy equipment. The operation was on the abandoned Lolo #5 mining claim (see Figure 2-3). The mined area has not been reclaimed and this reach of the creek has approximately 950 feet of unstable banks (USFS 2002a).

Clearwater National Forest resource hydrology and fisheries specialists analyzed the Clearwater watershed condition for hydrologic integrity in 1997 (USFS 2003a). Lolo Creek was rated as having a "moderate" condition (USFS 2003d). A "high" condition is defined as a watershed having a robust condition in which no long-term changes occur even with major storm events. These watersheds have stable drainage networks and are in a desired functional condition. A watershed with a

"moderate" condition maintains a dynamic equilibrium and is functioning within its geomorphic threshold. Moderate watersheds often have higher levels of instream sediment, but the stream network remains stable. Most of the streams in the Lolo Creek drainage were rated moderate because of relatively high levels of cobble embeddedness (i.e., relatively high levels of sediment surrounding stream cobbles).

3.2.2 Geomorphology

The Lolo Creek watershed above Musselshell Creek has moderate topographic relief. Generally, land types are rated moderate to high for sediment delivery efficiency, and many stream channels are moderately to extremely sensitive to changes in flow and sediment (USFS 2003a). Sediment delivery efficiencies in this watershed are relatively high because of a relatively high drainage density, especially in first and second order streams higher in the watershed, and distance to stream channels are relatively short. This means that sediment generated on hillsides and steep slopes does not have long distances to travel before it reaches stream channels.

The Forest Service (2003a) reports that erosion and sedimentation are historical processes that can be considered as "background" effects, and are ongoing whether there are human activities or not. Management actions such as road construction, timber harvest, and fire suppression do not add new processes to the existing natural forces; they may, however, change the frequency and magnitude of the processes.

Lolo Creek has predominantly B3 and C3 channel types as defined by the Rosgen method (1994). Table 3-1 describes the channel types. In general, Type B channels are dominated by riffles with some reaches containing "rapids" and infrequently spaced scour-pools at bends or areas of constriction. Type C channels have lower gradients and are dominated by riffle/pool systems. The numbers given to the stream types generally describe the material making up the channel substrate, as shown in Table 3-1 (Rosgen 1994).

Table 3-1. Channel Descriptions by Channel Type

Rosgen Channel Type	*Channel Description*
A2	Entrenched, steep stream with a boulder substrate
A4	Entrenched, steep stream with a gravel substrate
A5	Entrenched, steep stream with a sand substrate
A6	Entrenched, steep stream with a silt/clay substrate
B3	Moderately entrenched stream with a cobble substrate
B4	Moderately entrenched stream with a gravel substrate
B5	Moderately entrenched stream with a sand substrate
G5	Entrenched (Gullied) stream with a sand substrate
G6	Entrenched (Gullied) stream with a silt/clay substrate
Source: Rosgen 1994	

Studies conducted by Clearwater National Forest in 1998 showed that Lolo Creek had an average gradient of 2.0 percent (USFS 2002a). These studies rated stream reaches based on a subjective scoring system which rates stream habitat and stream geomorphological condition (USFS 2002a). Results of these studies are provided in Table 3-2. Channel stability was rated "good" on 22 reaches and "fair" on 15 reaches. Mean channel stability for the 37 reaches is 77.1 or "fair." The mean stream bank stability rating was 4.9 in 1993 and 4.7 in 1998. The overall decrease in stable stream banks was attributed to high flows in 1995 and 1996 (USFS 2002a).

The survey identified one area (Reach LO-34) where past mining activities at the abandoned Lolo #5 mining claim (see Figure 2-3) caused a substantial decrease in bank stability. In this reach, unstable stream banks have increased from 56 to 418 meters per kilometer. All other reaches are stable. Cobble embeddedness levels (i.e., the amount of sediment surrounding cobbles in the substrate) were 44.7 in 1993 and 44.7 in 1998 (USFS 2002a), both of which exceed the Forest Service's Desired Future Condition of 30 to 35 percent (USFS 1987). In general, the levels of cobble embeddedness in Lolo Creek are associated with natural geomorphic conditions and past management activities (USFS 2002a) such as road construction.

Numerous monitoring studies have been conducted by Clearwater National Forest to evaluate sediment levels and particle size distributions in the substrate of Lolo Creek. Wolman pebble counts (Wolman 1954) were collected in the summer of 1998 in Lolo Creek below Yoosa Creek, above White Creek and below Nevada Creek (USFS 2002a). Wolman pebble count data were collected in three riffles in each reach, representing over 600 individual particle size measurements for each reach. In addition, cores were abstracted from the deeper substrate of the creek and also analyzed for particle sizes. Figure 3-1 depicts combined results from the pebble counts and subsurface cores showing the percent distribution for several particle size classes. Percent distribution is shown by size class and as an accumulated percentage. These data show a normal distribution of particle sizes in the surface substrate for all three reaches. This distribution is typical of channels that are geomorphologically stable with only moderate levels of substrate sediment. An evaluation of Figure 3-1 shows that particle sizes making up less than 2 mm or less are approximately 12 percent of the surface substrate and 13 percent of the subsurface substrate. The Department of Agriculture defines particle sizes between 2 mm and 0.05 mm as sand and particle sizes between 0.05 mm and 0.002 mm as silt (Brady 1974). These data indicate that a small amount of the substrate material consists of sands, silts, and clays, while a majority of the material is made up of larger gravels, cobbles and rock.

(Source: USFS 2003e)

Figure 3-1. Average Particle Size Distribution of Lolo Creek Substrate Materials

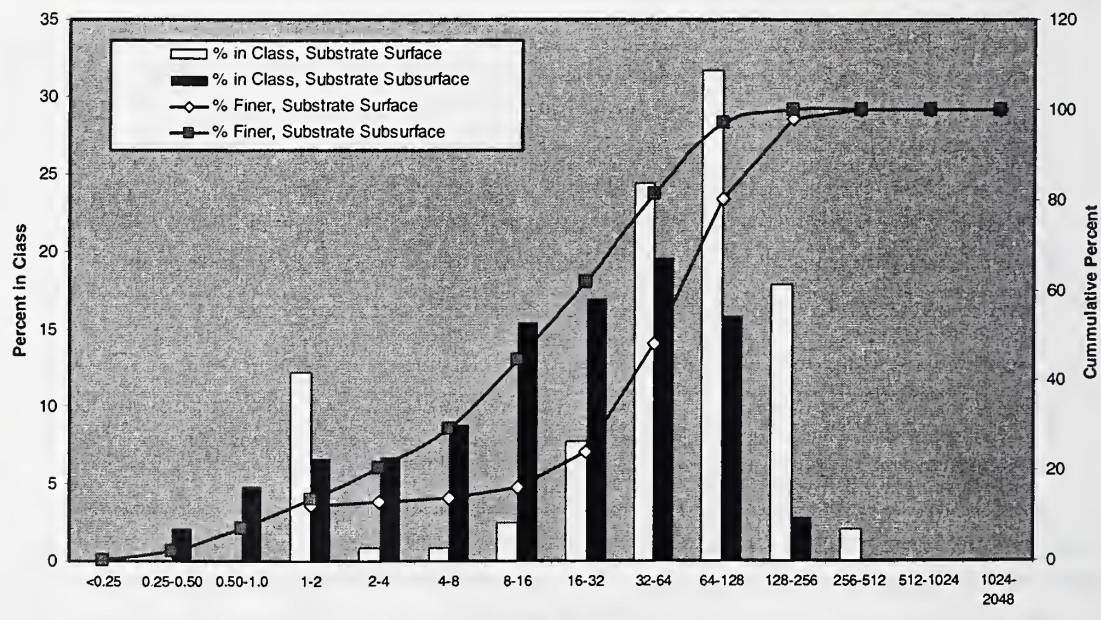


Table 3-2. Comparison of Mainstem Lolo Creek Channel Characteristics in 1993 and 1998

Reach [a]	*Channel Type*	*Channel Stability* [b] *1998*	*Bank Stability 1993*	*Bank Stability 1998*	*Cobble Embeddedness % 1993*	*Cobble Embeddedness % 1998*
LO-13	B3	69	4.9	5.0	47	46
LO-14	B3	66	5.0	5.0	47	41

Table 3-2. Comparison of Mainstem Lolo Creek Channel Characteristics in 1993 and 1998						
Reach [a]	*Channel Type*	*Channel Stability* [b] *1998*	*Bank Stability 1993*	*Bank Stability 1998*	*Cobble Embeddedness % 1993*	*Cobble Embeddedness % 1998*
LO-15	B3	72	5.0	4.8	36	35
LO-16	B3	85	4.8	4.7	50	51
LO-17	B3	86	5.0	4.8	51	48
LO-18	C3	101	4.3	4.9	56	62
LO-19	B2	60	5.0	5.0	27	35
LO-20	C3	96	4.8	4.4	44	46
LO-21	B3c	76	5.0	4.9	51	42
LO-22	B3c	76	5.0	5.0	46	45
LO-23	B3c	83	5.0	5.0	58	52
LO-24	C3	93	4.8	4.8	57	54
LO-25	B3c	58	4.7	4.9	40	37
LO-26	C3	86	5.0	4.5	59	55
LO-27	B3	55	5.0	5.0	42	40
LO-28	C3	88	4.8	4.7	54	50
LO-29	B2c	66	5.0	4.9	52	46
LO-30	B3c	97	5.0	4.5	55	56
LO-31	B2c	74	5.0	5.0	46	45
LO-32	B3c	100	4.9	4.7	49	52
LO-33	B3	55	5.0	5.0	48	45
LO-34	C3	101	4.3	2.9	39	48
LO-35	B1c	62	4.7	4.3	34	36
LO-36	C3	90	5.0	4.0	53	55
LO-37	B3c	78	4.4	4.7	36	41
LO-38	C3	93	4.7	4.2	76	56
LO-39	C3	70	4.8	4.6	26	38
LO-40	C3	81	4.8	4.3	18	43
LO-41	B3c	67	4.9	5.0	28	34
LO-42	B2c	59	5.0	5.0	44	46
LO-43	A2	56	5.0	5.0	7	12
LO-44	B2	56	5.0	5.0	13	25
LO-45	A2	52	5.0	5.0	7	12
LO-46	B3c	61	5.0	5.0	14	24
LO-47	C3	65	5.0	5.0	45	39
LO-48	C3	57	5.0	4.7	35	34
LO-49	C3	68	4.9	4.8	30	28
Mean		77.1 (Fair)	4.9 (Stable)	4.7 (Stable)	44.7% (DFC 30-35%)	42.8% (DFC 30-35%)

Table adapted from USFS 2002a
[a] a map of Lolo Creek reach locations is not available
[b] Scoring: <39 = Excellent; 39-76 = Good; 77-114 = Fair; >114 = Poor.
C = channel with a slope that is less than 2%.
DFC = Desired Future Condition

3.2.3 Stream and Sediment Discharge

Clearwater National Forest applied a flow-sediment yield model (WATBAL) to evaluate potential effects from the proposed White-White timber sale in upper Lolo Creek above Musselshell Creek in 2002 (USFS 2002c). The WATBAL model was used to predict the relative differences in sediment yields that occur naturally, based on land-types and management activities (USFS 2001b). Based on WATBAL, the Lolo Creek watershed (above Musselshell Creek) has 40 inches of precipitation annually (86,278 acre-feet) and 18 inches of runoff (38,192 acre-feet) (USFS 2002a). The watershed efficiency is 44 percent, which is common for forested montane stream systems. Natural sediment production was estimated at six tons per square mile per year. This would be considered the average rate of erosion and sediment transport through a natural system.

The Forest Plan standard for Lolo Creek is a C channel type (see Table 3-1), steelhead high fishable stream[4] (USFS 1987). The approximate maximum sediment loadings that generally support this criterion are 50 percent over natural. Sediment production should be at or below 35 percent over natural for 20 out of 30 years. Current sediment production in Lolo Creek is 44 percent over natural. Sediment production in Lolo Creek exceeded 35 percent over natural for 17 out of 30 years (USFS 2002c). Therefore, Lolo Creek does not meet the Forest Plan sediment standard (USFS 2002a).

In 2002, Equivalent Clearcut Acres amounted to 11.5 percent in the upper Lolo Creek watershed, but Clearwater National Forest indicates that this level is declining (USFS 2002a). WATBAL showed a peak flow increase of five percent over natural for 2002. This is less than the level of 15 to 20 percent that is considered to be potentially detrimental to the stream system (USFS 2001b). WATBAL predicted no accumulated sediment in Lolo Creek from road construction and logging activities. However, sediment does accumulate behind log weirs that have been placed in the creek to improve fishery habitat, but were not designed to pass sediment.

Stream discharge, suspended sediment, turbidity, and bedload have been monitored at the Section 6 Bridge on Lolo Creek since 1986. Turbidity results from an increase of suspended fine sediment that reduces water clarity. Results show low levels of suspended sediment and turbidity with no significant trend over time (Table 3-3). These turbidity data represent nearly 1,000 samples collected since 1986, all of which remain below the State turbidity standard of 50 NTU[5].

These data show that sediment production in Lolo Creek is meeting State water quality standards and beneficial uses for steelhead trout and cutthroat trout as listed in the Forest Plan for the Lolo Creek watershed (USFS 1987). Bedload is a measurement of sediment and larger size particles that move by jumping/bouncing, rolling, or sliding along the stream bottom. Bedload can be added to the suspended load to determine the total sediment load for a stream. A total of 141 bedload samples were taken at the Lolo Creek Section 6 Bridge monitoring station between 1980 and 2002. Table 3-4 shows average monthly stream discharge, suspended sediment concentration, suspended sediment load, bedload, and total sediment load. These data show the relationship between stream discharge and the total transport of sediment throughout the year. Peak stream discharge occurs in April and May with peak total sediment loads ranging between 11,665 pounds per day (lbs/day) in April and

[4] "High fishable" is a water quality/fishery objective defined as the maximum short-term reduction of water quality that is still likely to maintain a fish habitat potential that can support an excellent fishery relative to the stream's natural potential, and that will provide the capability for essentially full habitat recovery over time (USFS 1987).

[5] Nephelometric Turbidity Units are measures that result from a photogrammetric method of measuring light transmission through water. As turbidity increases, more light is scattered by suspended particles in the water and less light is transmitted through the water.

12,378 lbs/day in May. Total sediment load is reduced approximately 10-fold when stream flows decline later in the water year, to 1,780 lbs/day in July and 957 lbs/day in August. These data further show that a majority of the total sediment load is suspended. The bedload ranges between 5 percent and 48 percent of the total sediment load. Relationships between mean monthly stream discharge and sediment load are depicted in Figure 3-2.

The relationship between stream discharge and sediment transport, as depicted in Figure 3-2, is related to stream velocity. There are several factors, such as channel width, depth, and slope that determine the velocity of a stream at any given flow rate and at any given point. However, the velocity of the water flowing in a stream generally increases with increasing stream flow.

Table 3-3. Annual Mean and Maximum Stream Discharge, Suspended Sediment, and Turbidity Measured at the Lolo Creek Section 6 Bridge

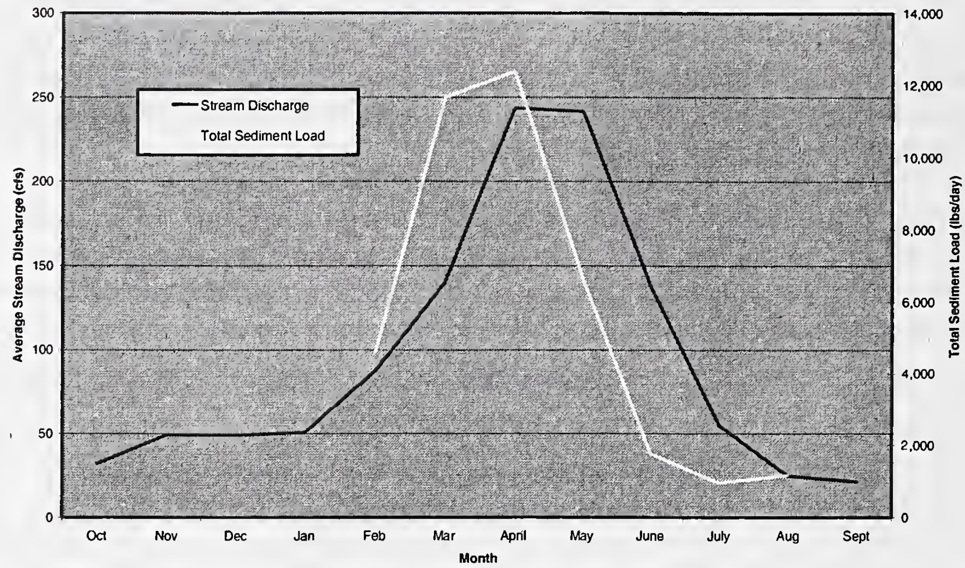
Year	*Mean Discharge cfs*	*Maximum Discharge cfs*	*Mean Suspended Sediment mg/l*	*Maximum Suspended Sediment mg/l*	*Mean Turbidity NTU*	*Maximum Turbidity NTU*
1986	95.9	448	10.7	50.7	1.6	5.3
1987	121	1,040	21.7	199	3.5	18.0
1988	57.7	360	5.9	40	2.2	4.5
1989	82.3	570	7.6	48	nm	nm
1990	77.2	332	8.4	95	1.6	9.0
1991	107	446	12.4	66	nm	nm
1992	57.9	262	16.8	145	nm	nm
1993	84.4	409	11.7	72	nm	nm
1994	57.9	343	12.7	59	nm	nm
1995	84.0	387	11.3	64	nm	nm
1996	152	1,209	9.7	60	nm	nm
1997	135	854	13.2	183	nm	nm
1998	46.4	120	17.8	185	3.0	24.8
1999	108	543	9.4	47	3.0	12.1
2000	91.9	409	9.1	95	2.3	11.1
2001	75.3	365	6.1	76	1.9	18.8

Table adapted from USFS 2002a
cfs = cubic feet per second.
mg/l = milligrams per liter
NTU = Nephelometric Turbidity Units
nm = not measured

Table 3-4. Average Monthly Discharge, Suspended Sediment Load, Bedload, and Total Sediment Load Measured at the Lolo Creek Section 6 Bridge

Month	*Average Stream flow cfs*	*Average Suspended Sediment Conc. mg/L*	*Average Suspended Sediment Load lbs/day*	*Average Bedload lbs/day*	*Total Sediment Load lbs/day*
Oct	32	10	859	nm	–
Nov	49	25	3,317	388	3,704
Dec	49	NA	NA	nm	–
Jan	51	NA	NA	nm	–
Feb	88	15	3,511	nm	–
Mar	140	12	4,399	212	4,611
April	244	14	9,113	2,552	11,665
May	242	15	9,459	2,918	12,378
June	138	15	5,372	1,288	6,660
July	55	10	1,541	239	1,780
Aug	25	7	500	458	957
Sep	21	8	455	721	1,175

Table adapted from USFS 2003e
cfs = cubic feet per second.
mg/l = milligrams per liter
lbs/day = pounds per day
NTU = Nephelometric Turbidity Units
nm = not measured



(Source: USFS 2003e)

Figure 3-2. Relationship between Stream Discharge and Total Sediment Load at the Lolo Creek Section 6 Bridge

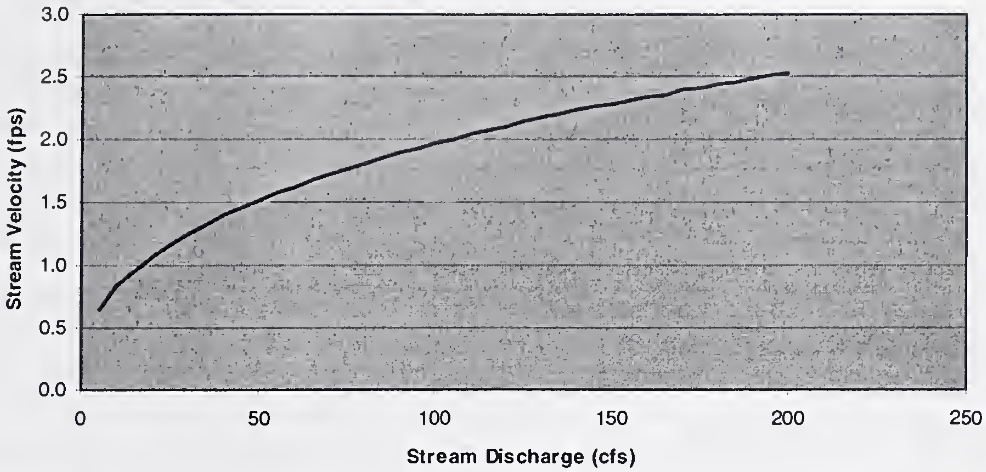
Increasingly higher velocities are required to dislodge, suspend, and transport increasingly larger sizes of sediment material. As flow velocity decreases, sediment particles settle out according to size. Sand and larger fractions drop out to the channel substrate until at lower velocities the stream has only enough energy to keep very fine sediments (i.e., silts and clays) suspended.

A relationship between stream discharge and stream velocity near the Section 6 monitoring station was estimated using channel cross-section information provided by USFS (2003e) and Manning's equation. This relationship is shown in Table 3-5 and Figure 3-3.

Table 3-5. Relationship between Stream Flow and Stream Velocity at the Lolo Creek Section 6 Bridge

Month	*Average Stream Discharge cfs*	*Average Flow Velocity Flow Velocity Fps*
Oct	17	1.00
Nov	28	1.21
Dec	29	1.23
Jan	29	1.23
Feb	51	1.53
Mar	83	1.83
Apr	143	2.24
May	142	2.24
Jun	79	1.80
Jul	32	1.28
Aug	14	0.93
Sep	12	0.88

Table adapted from USFS 2003e
cfs = cubic feet per second
fps = feet per second



(Source: USFS 2003e)

Figure 3-3. Relationship between Stream Flow and Stream Velocity at the Lolo Creek Section 6 Bridge

3.2.4 Fisheries and Aquatic Organisms

3.2.4.1 Aquatic Habitat

Aquatic habitat conditions have been degraded in the Lolo Creek drainage by past mining, grazing, road construction, and timber harvest (USFS 1999). Table 3-6 provides a summary of stream channel and aquatic habitat characteristics in the Lolo Creek project area between the confluences of Eldorado Creek and Yoosa Creek. Table 3-7 provides the average percentages of material comprising the substrate in Lolo Creek, also between the confluences of Eldorado Creek and Yoosa Creek (Clearwater BioStudies Inc. 1999a). The data indicate that the substrate is dominated by material larger than cobbles. This substrate provides limited spawning-sized gravels for salmonids. However, it provides excellent fish rearing habitat. Table 3-8 summarizes the average percentages of spawning habitat for various fish within the Lolo Creek project reach, based on a 1998 habitat survey. The data indicate that only a small percentage of the stream habitat area is available for salmonid spawning. Approximately two percent of the stream reach provides good spawning habitat. These data are consistent with the low availability of spawning gravels (Table 3-7).

In 1999, stream temperatures were monitored throughout the summer of 1999 on nine streams (not including mainstem Lolo Creek or lower Eldorado Creek) within the Lolo Creek drainage to evaluate habitat conditions for steelhead trout, spring chinook salmon, westslope cutthroat trout and bull trout. Overall, water temperatures of these streams met the State standards for cold-water biota: water temperatures did not exceed the daily maximum of 22 °C and the maximum daily average of 19 °C. Mainstem Lolo Creek and lower Eldorado Creek, however, have shown water temperatures higher than the State standards in past years (USFS 1999).

Table 3-6. Summary of Lolo Creek Aquatic Habitat Characteristics [a]	
Rosgen Classification (see Table 3-1)	2% A, 46% B, 52% C
Average Gradient	1.1 %
Stream Width	11.0 m
Stream Depth	0.253 m
Thalweg Depth	0.497 m
Bank Stability	4.6 (Stable)
Cobble Embeddedness [b]	45 %
Pool:Riffle Ratio [c]	61 : 39
Acting Debris / Potential Debris [d]	4 / 13
Pool Quality	2.6 (Good)
Instream Cover	2.3 (Moderate)
Bank Cover	1.1 (Sparse)

a = averages derived from 1998 summer stream survey data between Eldorado Creek and Yoosa Creek (Clearwater BioStudies Inc. 1999a).
b = The target cobble embeddedness rate for the Forest Plan should be less than 35 %.
c = The target pool:riffle ratio is 40:60 for Rosgen B channels and 50:50 for C channels.
d = Acting debris = Pieces of in-channel wood per 100m. Potential debris = riparian conifers available for recruitment into the channel per 100 m. (Forest Plan recommends 40 pieces Acting and 80 pieces potential per 100 meters of stream)

Table 3-7. Average Substrate Composition in Lolo Creek (percent)	
Bedrock	3.1
Boulders (>30.5 cm)	19.9
Large rubble (15.2 – 30.5 cm)	29.5
Small rubble (cobbles, 7.6 – 15.2 cm)	29.7
Coarse gravel (2.5 – 7.6 cm)	11.1
Small gravel (0.6 – 2.5 cm)	1.2
Sand (<0.6 cm)	4.6
Silt	0.8
Organic debris	0.1

Source: Clearwater BioStudies, Inc. 1999a

Table 3-8. Percent of Lolo Creek Stream Area Available for Spawning

Fish	*Percent*			
	Good	*Fair*	*Poor*	*Total*
Resident salmonid (spring)	0.2	0.4	0.5	1.1
Resident salmonid (fall)	< 0.1	0.2	0.6	0.8
Steelhead trout	1.6	6.1	4.2	11.9
Chinook salmon	0.3	2.9	6.1	9.3

Source: Clearwater BioStudies, Inc. 1999a

3.2.4.2 Threatened, Endangered, and Sensitive Species

Chinook Salmon (Oncorhynchus tshawytscha). Spring-run chinook salmon are a sensitive species that are larger than resident fish, which limits them to mainstem and large spawning streams where gradients are low, and there are large riffles with deep pockets of 3-6" diameter gravel. Concentrated spawning areas include Lolo Creek above Musselshell Creek and in Yoosa Creek. Juvenile rearing occurs in all of the Lolo Creek mainstem, Yoosa Creek below Camp Creek, and the lower reaches of Nevada Creek. Juveniles prefer pool-type habitats for rearing.

State, Federal, and Nez Perce Tribe hatchery supplementation (stocking) of spring/summer chinook adults has occurred in Lolo Creek over the last ten years. This has caused a significant increase in the number of these fish in the drainage. For example, densities of juvenile spring chinook salmon observed over 15 permanent snorkeling stations in Lolo Creek from 1992 to 1996 varied from 0.2 to 38.5. From 1997 to 2002, juvenile densities observed from the same stations have varied from 35.7 to 78.7 (USFS 2003a).

No historical records or current documentation of threatened fall-run chinook salmon spawning or rearing within the Lolo Creek watershed are available (USFS 2002a). There is no designated critical habitat for fall chinook in the study area; the closest critical habitat is downstream, on the mainstem of the Clearwater River at the mouth of Lolo Creek.

Steelhead Trout (Oncorhynchus mykiss). Snake River Basin steelhead trout are listed as a threatened species. They are summer steelhead trout, which leave the ocean and enter fresh water from late August to October, then spawn during the following spring from March to May. Steelhead that reach the Clearwater are thought to be age 2 ocean fish. Although steelhead trout are capable of spawning more than once before they die, most steelhead trout in the Clearwater Basin survive to spawn only once (USFS 1999).

Spawning and initial rearing of juvenile steelhead trout generally take place in moderate gradient (generally 3-5%) streams. Females dig redds and deposit 1,500 to 6,000 eggs in pea- to baseball-sized gravel. The eggs hatch in about 35-50 days, and alevins remain in the gravel 2 to 3 weeks before they emerge as fry in late spring and begin to actively feed. Snake River Basin steelhead trout usually smolt as 2- or 3-year olds and migrate to the ocean (USFS 1999).

Productive steelhead trout habitat is characterized by complexity, primarily in the form of large and small wood and/or boulders and rock. Juveniles may move around in a basin to take advantage of favorable habitat. Fry prefer protected and complex edge habitat with low velocity (<0.3 ft/s), and are seldom observed in water over 15 inches deep. Summer rearing takes place primarily in the faster parts of small and deep scour pools with some form of surface cover and wood or medium to large substrate (cobble or boulders). Other important habitat components for juveniles are pools with "bubble curtains" undercut/scoured areas, and pocket water in deep riffles and rapids. Winter rearing occurs more uniformly at lower densities across a wide range of fast and slow habitat types. Small tributaries and lakes are probably important winter habitat (USFS 1999).

The Lolo Creek drainage produces very few steelhead trout due to overall low adult escapement, spawning, migration, and habitat conditions. Adult and juvenile plantings have occurred over the past 20 years, and steelhead production that does occur is most likely a combination of wild/natural and hatchery production. Steelhead trout mostly spawn in the mainstem of Lolo Creek (from Musselshell Creek to Yoosa Creek), accessible tributaries in upper Lolo Creek drainage, and in the Yoosa Creek drainage.

Juvenile steelhead rearing has been documented in the mainstem of Lolo Creek. Fish population surveys over the past 15 years have found juvenile steelhead trout at most sampling sites throughout the mainstem Lolo Creek (Table 3-9). Fish population surveys in 1996, 1998, and 1999 showed very low average densities in the mainstem Lolo Creek: 0.51, 0.33, and 0.95 fish per 100 square meters, respectively (USFS 2002a). Thus, the likelihood of wild steelhead adults migrating and spawning in Lolo Creek is considered very low in any given year, probably under 100 spawning pairs (USFS 2002a).

Table 3-9. Summary of Steelhead Trout Populations Within the Lolo Creek Drainage [a]

Stream/Reach	*Number of Fish Population Stations*	*Number of Stations with Steelhead Trout*
Lolo mainstem [b]	214	207
11 Lolo tributaries [c]	18	2
Yoosa Creek [c]	39	30
Lolo mainstem [d]	15	15
Lolo mainstem [e]	47	46
Lolo mainstem [f]	68	58
Yoosa Creek [f]	27	24
Lolo Creek (downstream USFS lands) [g]	3	3

a = Does not include pre-1992 data from IDFG and pre-1988 USFS data.
b = Snorkeling data collected between 1988 and 1999 and 2001 by USFS personnel or Clearwater BioStudies, Inc.
c = Snorkeling and/or electrofishing data collected between 1991 and 1997 by USFS personnel, Clearwater BioStudies, Inc. or Isabella Wildlife Works.
d = U.S. Fish and Wildlife Service – Idaho Fishery Unit: Snorkeling data from 1987-1988, and 1990-1991. Two bull trout were observed during the 1987 survey on mainstem Lolo Creek (between White Creek and Yoosa Creek).
e = Idaho Department of Fish and Game: Snorkeling data from 1985 (Petrosky and Holubetz 1986), and 1994 (Hall-Griswold *et al.* 1995).
f = Nez Perce Tribe snorkeling data from 1993 (USFS 2002a as cited from Hesse and Arnsberg 1994, 1995).
g = U.S. Department of the Interior, Bureau of Land Management (BLM 2000) snorkeling data from three sites in Lolo Creek downstream of USFS lands (stream miles: 0.9, 6.7 and 22.0).

<u>Bull Trout</u> *(Salvelinus confluentus)* are listed as a threatened species and are found in cold-water streams, rivers, and lakes, and they can be resident or migratory. Migratory adults can exceed 600 millimeters length, while residents are much smaller, from 150 to 300 millimeters. Bull trout spawning occurs in clear, headwater streams with a gravel or rubble bottom, and spawning may take place each year or in alternate years. In the spring, migratory adults return to spawning streams from downstream rivers or lakes in the spring. Spawning by resident and migratory bull trout begins when stream temperatures fall to between five and nine degrees Celsius, which would normally be from mid-August to November. Eggs hatch in January and the fry remain within the gravel until early spring. Some juveniles (which are designated as migratory adfluvial) migrate to downstream lakes and larger rivers by mid-summer. Other juveniles (designated as fluvial) may rear in tributary streams for three to four years before recruiting to larger streams and rivers (USFS 1999).

Although the Lolo Creek drainage was probably within the historical range of bull trout, populations have since been largely extirpated. Fish population data do not show any bull trout spawning and early rearing in the Lolo Creek drainage over the past several years (USFS 1999).

Between 1974 and 2000, very few bull trout were observed through fish population monitoring via snorkeling and electrofishing surveys in the Lolo Creek drainage. The Clearwater Basin Bull Trout Technical Advisory Team (CBBTAT 1998) reported that several bull trout were observed in the

mainstem of Lolo Creek between 1987 and 1994. USFWS, IDFG, and Nez Perce Tribe monitoring efforts also observed individual bull trout during snorkeling surveys in the mainstem Lolo Creek during this period. However, bull trout were not observed by these agencies or by the Forest Service during monitoring activities in 1996-1999 and 2001. Fish population surveys conducted by the BLM documented one juvenile bull trout downstream of USFS lands in 2000 (Table 3-10). Bull trout were not observed by the Forest Service in 2002. In addition, bull trout have not been observed in the Eldorado Creek, Musselshell Creek, or Yoosa Creek drainages.

The extent of bull trout spawning and production is considered very low (Table 3-9). Habitat conditions and warmer temperature regimes appear to limit bull trout production in the Lolo Creek drainage. The 1999 survey of nine streams in the watershed found that temperatures in each of these streams exceeded the desired bull trout rearing temperature of 10 °C or below. Other than temperature, other habitat conditions in upper Lolo Creek would not preclude bull trout spawning, and the Lolo Creek drainage has been designated an adjunct watershed for future bull trout recovery efforts (USFS 1999).

Pacific lamprey (*Lampetra tridentata*) is listed as a Federal species of concern (USFS 2003d) and is listed by the Idaho Department of Fish and Game as a State endangered species. Pacific lamprey have an anadromous life history where young adults migrate to the ocean, remain there for up to four years, then return to streams to spawn (April to July), after which time they die. Upon hatching, juvenile lamprey (amocetes) typically embed themselves in sand-dominated, low-gradient channels where they filter-feed and grow. They typically rear in these areas for up to seven years before migrating to the ocean to become parasitic on various ocean fish (Moser and Close 2003). Some sandy habitat appropriate for lamprey spawning occurs within the mainstem of Lolo Creek, and data from the Nez Perce Tribe indicates that both juvenile and young adult lampreys do occur in Lolo Creek (USDOE 1997). Although there is no documented case where Pacific lamprey exists within the project area of Lolo Creek, recent dam counts and the numbers in mainstem Lolo Creek as well as the rest of the Snake River basin has been declining.

Table 3-10. Summary of Bull Trout Populations Within the Lolo Creek Drainage [a]

Stream/Reach	*Number of Fish Population Stations*	*Number of Stations with Bull Trout*	*Bull Trout Age Classes and Densities*
Lolo mainstem [b]	214	0	
11 Lolo tributaries [c]	18	0	
Yoosa Creek [c]	39	0	
Lolo mainstem [d]	15	2	Two juvenile bull trout; 1-4" and 1-5" in 1987.
Lolo mainstem [e]	47	0	
Lolo mainstem [f]	68	3	One juvenile bull trout 1993 and two juvenile bull trout 1994.
Yoosa Creek [f]	27	0	
Lolo Creek (downstream USFS lands) [g]	3	1	One 6-9" bull trout sighted at station #2

a = Does not include pre-1992 data from IDFG and pre-1988 USFS data.
b = Snorkeling data collected between 1988 and 1999 and 2001 by USFS personnel or Clearwater BioStudies, Inc.
c = Snorkeling and/or electrofishing data collected between 1991 and 1997 by USFS personnel, Clearwater BioStudies, Inc. or Isabella Wildlife Works.
d = U.S. Fish and Wildlife Service – Idaho Fishery Unit: Snorkeling data from 1987-1988, and 1990-1991. Two bull trout were observed during the 1987 survey on mainstem Lolo Creek (between White Creek and Yoosa Creek).
e = Idaho Department of Fish and Game: Snorkeling data from 1985 (Petrosky and Holubetz 1986), & 1994 (Hall-Griswold *et al.* 1995)
f = Nez Perce Tribe snorkeling data from 1993 (USFS 2002a as cited from Hesse and Arnsberg 1994, 1995).
g = (BLM 2000) snorkeling data from three sites in Lolo Creek downstream of USFS lands (stream miles: 0.9, 6.7 and 22.0).

Westslope Cutthroat (*Oncorhynchus clarki lewisi*) is a sensitive species that has wide distribution and can be found in streams with channels as narrow as 18 inches. The highest densities are found in the small tributary streams, and in the mid and upper reaches of the larger streams where competition with other trout or salmon species is limited (USFS, 1999). Cutthroat spawning occurs in pool tailouts and in runs in pockets of gravel with 0.5- to 2-inch diameter. Gravel pockets can be relatively shallow and still be adequate for egg incubation, which is why this species does so well in small or headwater streams. Rearing occurs in pools, along stream margins, and in pocket water habitats.

Lolo Creek supports populations of westslope cutthroat trout. The cutthroat population for the upper Lolo Creek watershed is considered strong, with densities averaging 2.3 (age 2+) fish/100 square meters (Clearwater BioStudies Inc. 1999a). Designated critical reaches for cutthroat occur primarily in low gradient areas of tributaries and in Lolo Creek above Dutchman Creek.

3.2.4.3 Other Aquatic Organisms

Mountain whitefish (*Prosopium williamsoni*) prefer cold (8-10 °C) mountain streams with large riffles or pools averaging 3-4 feet in depth (Lusch 1985). They are primarily bottom feeders with a preference for insects, snails, amphipods and crawfish. They have also been known to eat salmonid fry and eggs of its own kind. Whitefish are broadcast spawners and require a gravel bottom surface on which the eggs will attach themselves. Whitefish occur in Lolo Creek in very low numbers; although the creek provides spawning opportunities, summer water temperatures may limit juvenile survival (USFS 2000).

Sculpins (*Cottus spp.*) occur in Lolo Creek but their populations and condition is largely unknown. Sculpins generally prefer small cobble-sized substrate for breeding and non-embedded substrate in run/pool type habitats for cover. They are an important food source for other aquatic and terrestrial animals (USFS 2000).

Aquatic Invertebrates. Aquatic insects are a primary food source of juvenile salmon and trout, and are a large part of the diet of resident adult trout and other coldwater fish. The presence, distribution, and abundance of aquatic invertebrates are dependent upon basic habitat conditions such as water temperature, water quality and chemistry, substrate, and flow. In general, the four most important aquatic insect groups or "orders" that comprise the diet of salmonids and many other fish include true flies (order *Diptera*), mayflies (*Ephemeroptera*), caddisflies (*Tricoptera*), and stoneflies (*Plecoptera*).

Limited aquatic invertebrate data exist for Lolo Creek. At one station located just upstream of the confluence with Musselshell Creek from a survey conducted by IDEQ in July 1995, a Macroinvertebrate Biotic Integrity (MBI) score of 3.94 was calculated (IDEQ 1996). A score greater than 3.5 indicates that the macroinvertebrate community is not impaired and therefore similar to background reference conditions within the ecoregion.

3.2.5 Wildlife

Table 3-11 identifies the Forest Service's designated management indicator and sensitive wildlife and avian species that may occur in the Lolo Creek project area.

3.2.5.1 Forest Service Management Indicator and Sensitive Wildlife

Birds. Pileated woodpeckers (*Dryocopus pileatus*) and belted kingfishers (*Ceryle alycon*) are recognized Forest management indicator or sensitive bird species (Table 3-11). Though pileated woodpeckers may be observed in riparian areas, they reside in mature forest habitats that would not be disturbed by the proposed action and alternatives. Belted kingfishers are relatively common and generally inhabit riparian areas; they feed on fish. It is likely they nest in streambanks or possibly in nearby vegetation in the Lolo Creek study area.

Mammals. Big game management indicator species that may occur in the study area include white-tailed deer, elk, and moose. In addition, American martens (management indicator) and fishers (sensitive) may be present.

Amphibians. Suitable habitat exists in the study area for the western (boreal) toad and the Coeur d'Alene salamander, so these species may be present.

3.2.5.2 Threatened and Endangered Wildlife

Four wildlife species in the Clearwater National Forest have been listed by the U.S. Fish and Wildlife Service under the Endangered Species Act as being endangered or threatened: gray wolf (listed as endangered), bald eagle (threatened), grizzly bear (threatened), and lynx (threatened). Grizzly bears do not occur in the Lolo Creek project area. The potential occurrence of the remaining three species within the study area is as follows:

- Bald Eagle (*Haliaeetus leucocephalus*). No use by bald eagles has been documented on National Forest land within the Lolo Creek drainage (USFS 2002a).
- Gray Wolf (*Canis lupus*). The upper Lolo Creek watershed is within the boundary of the Central Idaho nonessential population area for the gray wolf. There are numerous, and increasing, wolf sightings (animals and tracks) in Lolo, Musselshell, and Eldorado Creek watersheds. It is likely that denning is or soon will be occurring in or near the Lolo Creek watershed, but it is unlikely that denning will occur in the study area.
- Lynx (*Lynx canadensis*). Nine lynx sightings were recorded in Clearwater County between 1942 and 1995 (USFS 2002d). The Lolo Creek study area does not contain suitable lynx habitat (USFS 1999).

3.2.6 Vegetation and Wetlands

3.2.6.1 Riparian Vegetation

The riparian area along Lolo Creek is predominantly forested wetlands with a dominant community type of western red cedar/ladyfern. Associated species include grand fir, Engelmann spruce, Douglas fir, mountain ash, willow, common snowberry, dogwood, Sitka alder, devil's club, western thimbleberry, queencup, beadlily, arrowleaf, groundsel, starflowered Solomon's seal, plume grass, and pine grass. Areas within 300 feet of Lolo Creek are designated as being within the Riparian Habitat Conservation Area. These areas receive primary emphasis and management activities subject to specific standards and guidelines consistent with PACFISH[6] objectives.

[6] PACFISH: Forest Service and Bureau of Land Management interim strategies for managing anadromous fish-producing watersheds in Oregon, Washington, Idaho, and Northern California.

The riparian wetland areas are generally associated with a high water table near the stream and soils that are often saturated allowing wetland plants such as ladyfern, sedges, devil's club, and willows to grow.

Table 3-11. Sensitive Wildlife and Management Indicator Species

Species	*Habitat Description*	*Likelihood of Occurrence* [a]
Management Indicator Species		
Elk *Cervus elaphus*	Grasses, forbs and some dryland shrubs provide nutritious forage for elk throughout the summer and into the fall. These areas (often most evident on major ridges and within upland basins) typically support high to moderate habitat use. A large percentage of the pregnant cows calve on broad gentle ridges where seclusion from human disturbance is important.	Elk are widespread in both project areas. The lower and western portions of the Lolo Creek drainage are used by elk during mild winters (USFS 2003b). The lower portions of Moose Creek provide winters habitat.
Moose *Alces alces*	Moose are wide-ranging, preferring shrubby, mixed coniferous forests with nearby lakes and marshes, and streams. They generally require water bodies for foraging. They browse on new growth of trees and shrubs (e.g., willow, aspen and fir) and on vegetation associated with water. Moose breed in September to late October, and calves are born late May-early June.	Moose are relatively common in the project areas where riparian areas provide both browse forage and dense hiding cover.
White-tailed deer *Odocoileus virginianus*	These deer typically use mixed deciduous/conifer forests near water for dense cover and forage food. They breed in the fall and fawns are born in spring.	Year-round deer habitat is considered moderate to heavy in both project areas.
American marten *Martes americana*	Martens prefer dense, high-elevation grand fir, subalpine forests. They also utilize high elevation riparian areas. Moist habitats of mature lodgepole pine and dense cedar/grand fir forests are utilized at lower elevations. Down logs and snags provide refuge and den sites. The size of a marten's home range is 0.8 to 15.7 km^2 (Ruggiero *et al.* 1994).	Suitable marten habitat is present in upper Lolo creek (USFS 2003b), and the Moose Creek drainage.
Pileated woodpecker *Dryocopus pileatus*	Pileated woodpeckers primarily utilize 20 inch or greater diameter-breast-height snags for nesting; however, they are known to forage on large snags and down dead wood, feeding principally on carpenter ants. Pileated woodpeckers tend to avoid open areas for foraging, preferring forests with significant old-growth component and high basal area (USFS 2003b).	Pileated woodpeckers are not likely to utilize the riparian areas for nesting, but may occasionally use the vicinity for foraging.
Belted kingfisher *Megaceryle alcyon*	Kingfishers (a neotropical species) are predators of small fish where they hunt by perching over or along the stream. Therefore, fairly wide-open stream courses without significant ermergent vegetation and clear water are preferred.	This species is common along Lolo Creek and its major tributaries. It is also expected along Moose Creek.
Sensitive Species		
Fisher *Martes pennanti*	Fishers tend to select moist habitats, characterized by dense canopy cover, in mature or late mature stands of lodgepole pine, spruce, subalpine fir grand fir or cedar. Fisher habitat use is typically within 400 m from perennial streams with forested riparian areas, often in proximity to alder glades and small meadows. The primary prey of fishers is small mammals (such as squirrels and snowshoe hare), while carrion is also utilized. The average home range for fishers range from 15 km^2 for females to 40 km^2 for males (Ruggiero *et al.* 1994). Most studies suggest that fishers are tolerant of moderate human activities.	Due to the prevalence of fisher habitat in the Lolo Creek and Moose Creek drainages, fishers are expected to be relatively common.

Table 3-11. Sensitive Wildlife and Management Indicator Species		
Species	*Habitat Description*	*Likelihood of Occurrence* [a]
Sensitive Wildlife Species		
Wolverine *Gulo gulo*	Wolverines typically inhabit large areas of medium-aged forests or scattered mature forest areas around slides, cliffs, swamps and meadows. Habitat types used by wolverines include sub-alpine fir, lodgepole pine, western larch, Douglas fir and mixed conifers. They typically inhabit remote mountainous areas where human disturbance is unlikely. Home ranges for females in Idaho range between 16-516 km^2 (Ruggiero *et al.* 1994).	The riparian areas along the project creeks provide poor habitat and the level of human activity would preclude wolverine use in the affected area.
Townsend's big-eared bat *Plecotus townsendii*	Western big-eared bats are more commonly found in southern Idaho and at much lower elevations than those of the project areas. They are communal and utilize natural caves or old underground mines and, occasionally, old buildings.	There are no caves, buildings, mines, or bridges that appear to meet the criteria for suitable habitat in the project areas.
Northern goshawk *Accipter gentillis*	The Northern goshawk is a forest-adapted raptor that prefers mature coniferous stands with dense canopy cover and mature forest edge. They typically nest in stands of mature or late mature forest that are larger than 25 acres and have relatively dense crown closure. Northern goshawks typically feed on a variety of forest dwelling mammals and birds ranging in size from snowshoe hares to chipmunks.	Riparian zones along the project areas are not suitable for nesting. However, this species has been sighted in the Lolo Creek watershed and is also expected to be present in the Moose Creek drainage.
Flammulated owl *Otus flammeolus*	Flammulated owls are typically associated with large ponderosa pine and Douglas fir trees on south and western slopes. Suitable habitat varies from open, large ponderosa pine (with little under-story) to multi-layered and closed-canopies. This owl preys only on insects and typically forages in the edge habitats between forest and grassland, as well as in forests of low or moderate density. Breeding territories are typically located near open areas, including old burns, grassy hillsides, natural clearings and some logged areas. They often nest in cavities previously constructed by flickers or pileated woodpeckers.	The project areas do not contain suitable habitat for the flammulated owl.
Black-backed woodpecker *Picoides arcticus*	Large burned forests during early post fire years are potentially important source habitats and believed critical for supporting black-backed woodpecker populations. Burned conifer forests and other insect infested forests provide key conditions necessary for both nesting and foraging.	There are no documented sightings and suitable habitat is very limited in the Lolo Creek and Moose Creek project areas.
Harlequin duck *Histrionicus histrionicus*	Harlequin ducks are diving ducks that winter along the Pacific coast and then migrate inland to nest along forested, mountain streams. Harlequin ducks prefer streams in canyons, or meandering and braided streams. They prefer dense riparian vegetation for cover and undisturbed, pristine areas are considered prime habitat for Harlequin duck nesting and brood-rearing activities.	Breeding has not been documented in the Clearwater National Forest, but a few sightings have been reported in the upper Lochsa River area and near the mouth of Papoose Creek (USDOE 1997). There is a very low probability of occurrence in the project areas.
Western (Boreal) toad *Bufo boreas boreas*	This species utilizes spring pools and slow-moving portions of streams. They generally breed in early July, depending on runoff water during May and June. Tadpole larvae are usually restricted over muddy bottoms where they feed on detritus or filtering suspended plant material. They metamorphose into adults during summer and early fall (Nussbaum *et al.* 1983).	The boreal toad is likely to be present in the project areas since suitable habitat exists.

Table 3-11. Sensitive Wildlife and Management Indicator Species		
Species	*Habitat Description*	*Likelihood of Occurrence* [a]
Coeur d'Alene salamander *Plethodon vandykei idahoensis*	This salamander is usually found in moist, forested areas at moderate elevations below 5,000 feet. They occur in wet, humid and cool microhabitats. Typical habitat features are fractured bedrock or gravel, often under a dense tree canopy, near cascading water. Coeur d'Alene salamanders feed primarily on aquatic and semi-aquatic insects.	Local populations appear to represent the most southern distribution of Coeur d'Alene salamanders. Although there are no reported sightings, some suitable habitat does exist in both project areas.
Northern leopard frog *Rana pipiens*	The northern leopard frog is found in marshes and wet meadows from low valleys to mountain ridges. It is also found in areas virtually devoid of fish, preferring cattail or sedge marshes and weedy ponds for breeding.	There are no known or suspected occurrences of these frogs in the Clearwater National Forest.
a = Likelihood of occurrence for Lolo Creek project area as described in USFS (2003b)		

The site of the former Collette Mine on the Lolo #5 mining claim is dominated by wetlands or areas that historically would have been classified as wetlands but were drastically disturbed by mining. In some areas, emergent wetlands have formed in parts of the old channel where it was dredged. However, the majority of the area is dominated by abandoned tailings piles. Although some willow and other obligate wetland species can be observed in the area, these piles have generally restricted the reestablishment of a functional vegetation community in many parts of the floodplain. Likewise, the stream banks of Lolo Creek in this area are unstable and lack the appropriate riparian vegetation and root mass to provide shading and armoring of banks. A wetland delineation has not been conducted to determine wetland area and describe potential wetland types, functions and values.

3.2.6.2 Forest Service Sensitive Plant Species

Table 3-12 identifies Forest Service Northern Region Idaho sensitive plant likely to occupy riparian areas typified by areas along Lolo Creek.

Table 3-12. Sensitive Plant Species Commonly Associated with Riparian Habitats		
Species	*Habitat Description*	*Likelihood of Occurrence* [a]
Deer fern *Blechnum spicant*	Found at mid-elevations in moist, mineral soils of shaded mature western red cedar and western hemlock habitat types. Rarely occurs in wet areas of other habitat types. It has a strong affinity for draws and riparian areas. Habitat may be related to duration and depth of snowpack.	Known populations are within riparian habitat conservation areas in Lolo Creek watershed. Not known to be present in Moose Creek area but could occur.
Mingan moonwart *Botrychium minganense*	A small fern-like plant, with spores on a separate branch, that occurs widely in North America. It grows in a wide variety of habitats, including meadows, prairies, riverbanks and moist forests. Most Idaho occurrences have been found at mid-elevations on northern mountains on the Panhandle NF; CNF populations are from old cedar forests, on all aspects, and between 3,400 and 4,500 feet elevation.	Locations include upper North Fork Clearwater, East Fork Moose Creek, and Lolo Creek. Two populations have been noted in the Lolo Creek watershed, both occur on major ridges. Though no reports of occurrence in Moose Creek, it is probable the species could occur there.
Green bug-on-a-stick *Buxbaumia viridis*	A moss that lives in soil, humus or very rotten logs in shady, moist forests. Elevations range from low to subalpine where the climate is generally misty.	Is known to occur in Lolo Creek and near Forest Service lands in the Lolo Creek drainage. Though no reports of occurrence in Moose Creek, it is probable the species could occur there.

Table 3-12. Sensitive Plant Species Commonly Associated with Riparian Habitats

Species	*Habitat Description*	*Likelihood of Occurrence* [a]
Henderson's sedge *Carex hendersonii*	A large sedge of the Pacific Coast, with disjunct populations in Idaho's Lochsa, Selway, and Clearwater River drainages. Idaho populations occur on low elevation river terraces in shady cedar forests with maidenhair fern, on flat to slightly sloped moist ground. Populations usually occur in near-climax forests of river and stream bottoms, and less well-developed populations and scattered individuals occur upslope in drier cedar habitat types.	ICDC records indicate a population in a Cedar Creek tributary near Lolo Creek. Though no reports of occurrence in Moose Creek, it is probable the species could occur there.
Bristle-stalked sedge *Carex leptalea*	An inconspicuous boreal sedge associated with cool wet meadows, spahgnum bogs, fens, swamps, and lake shores.	On the CNF it has been found at Musselshell Meadows near Lolo Creek. It is not known or suspected to be in the Moose Creek project area.
Cup lichen *Cladonia andereggii*	Very little is known about this rare fruticose lichen, its habitat requirements, or the substrate on which it grows. There are only two occurrences worldwide, both from a moist cedar/hemlock forest along a tributary of the upper Palouse River. These were found in 1989. The area was surveyed recently but the species was not found.	Not known or suspected to occur in Lolo or Moose Creek project areas. It is not listed by ICDC in Clearwater or Idaho counties.
Clustered lady's slipper *Cypripedium fasciculatum*	This rare orchid is represented by small populations in eight western states. In Idaho it is associated with low elevation river canyons (1,500-4,200 feet elevation) and cedar habitats, and occasionally in drier grand fir and Douglas fir habitats. It prefers patchy, filtered light, a thick duff layer, and moderate to low understory cover.	Two populations are known to exist near the Lolo Creek watershed and it is probable this species occurs within Lolo Creek as well. It is not known or suspected to be in the Moose Creek drainage.
Light moss *Hookeria lucens*	Habitat is moist or wet shaded areas, on rock, soil, humus, bark, conifer needles on the forest floor, and decaying wood. Predominantly in wet sites, especially in humid coniferous forest, occasionally submerged in pools in depressions, on damp soil or rotten wood, and sometimes along watercourses.	Two populations have been recorded in Eldorado. Though it has not been reported in Lolo Creek, it is probable the species occurs there. It is probable the species occurs in Moose Creek as well.
Licorice fern *Polypodium glycyrrhiza*	This fern mainly occurs along the west slopes of the Cascade/Coast Ranges. Only two inland locations are known- both on the CNF. One on Isabella Creek near its confluence with the North Fork Clearwater River. The other along Elk Creek, (a tributary of the North Fork). They occur at low elevations (1,800 ft) in moss-covered rock crevices along streams, within moist western red cedar forest. Sites are shaded, and wet year-round from seepage.	Not known or suspected to occur in Lolo or Moose Creek project areas. ICDC has not reported this species in Idaho county.
Naked mnium *Rhizomnium nudum*	A dark green leafy moss of boreal and temperate forests on soil, humus, or rotten logs, often along streams or in damp depressions, and within conifer forests, from near sea level to subalpine zones. Most populations on the CNF are riparian, but it occasionally is found on moist slopes well above the streams.	Records indicate a presence along Lolo Creek. This species has not been reported in Clearwater county, and is not expected to occur in the Moose Creek drainage.
Short-styled triantha *Triantha occidentalis brevistyla*	A plant of northern, boreal wetlands and river banks. It is rare in Idaho where it has been found on rock bars along large streams and in wetlands or bogs. These plants grow in rock and cobble below the seasonal high-water line.	On the CNF three populations are documented from low elevations on the North and Middle Fork Clearwater River. There is suspected habitat for this species to occur in both project areas, although no populations have been reported.

Table 3-12. Sensitive Plant Species Commonly Associated with Riparian Habitats

Species	*Habitat Description*	*Likelihood of Occurrence* [a]
Idaho strawberry *Waldsteinia idahoensis*	Habitat consists of open sites in montane forests, in western redcedar, grand fir, and subalpine fir habitat types. It grows along streams, extending onto toe-slopes and even up to mid-slope positions. Cool, moist microsites are most favorable for its development. On the CNF, a typical site is in a bottom with western redcedar mixed with cool species such as subalpine fir and spruce. Plants are most abundant in openings or along roadsides within this habitat.	Though no records indicate presence, it is possible this species may occur in both the Lolo Creek and Moose Creek drainages.

a = Likelihood of occurrence for Lolo Creek project area as described in USFS (2003b) and from Idaho Conservation Data Center (ICDC 2003).

3.2.7 Recreation

Clearwater National Forest contains thirty-seven developed campgrounds. It also contains timber harvest areas, roads, gravel pits, recreation facilities, utility corridors and mining claims. It is estimated that 915,921 people visit the Clearwater National Forest annually. Recreational opportunities within the forest are numerous in many areas, including Lolo Creek. Recreational activities in the Forest include hunting and fishing; camping and hiking; boating and rafting; mushrooming and berry-picking; cross-country skiing and snowmobiling; gold panning and rock collecting; bird watching; photography; and sightseeing. These types of activities depend on area access and a well-developed transportation network (USDOE 1997).

3.2.7.1 Forest Service Management of Recreation

The Forest Service manages recreation by guidelines set forth in the Recreation Opportunity Spectrum (ROS) (USFS 1994b). The ROS provides a framework by which outdoor recreation environments, activities, and experience opportunities can be organized and defined. Underlying the ROS is the basic assumption that quality outdoor recreation is best satisfied through a diverse set of opportunities.

The ROS framework is arranged along a continuum from primitive to urban, as shown in the sidebar. Opportunities for experiences along the continuum represent a range from a very high probability of solitude, self-reliance, challenge and risk to a very social experience where self-reliance, challenge, and risk are relatively unimportant.

The ***Recreational Opportunity Spectrum*** is based on the premise that people expect and seek variety in forest settings. The Spectrum establishes six classes that reflect the range of possible settings:

- Primitive
- Semi-primitive Non-motorized
- Semi-primitive Motorized
- Roaded Natural
- Rural
- Urban

An area's class is determined by a combination of factors:

- Remoteness
- Naturalness (level of human modification)
- Social setting (number of encounters with people)
- Degree of visitor controls

Source: USFS 1994b

3.2.7.2 Recreation in Lolo Creek

The Forest Service manages the Lolo Creek area as "Roaded Natural" (USFS 1987). The Roaded Natural class is characterized by mostly natural-appearing landscapes as viewed from sensitive roads and trails. Interaction with other users in developed campsites are common, but with some chance for privacy. Access and travel are available to conventional motorized vehicles including sedan, trailers, recreational vehicles, and some motor homes. Vegetative alterations are done to the landscape to maintain desired visual and recreational characteristics.

Recreation opportunities in the Lolo Creek area include fishing, hunting, camping, and hiking, as well as suction dredge mining.

Two prominent trails are located in or near the project area, the Lewis and Clark National Historic Trail and the Nez Perce (Nee-Me-Poo) National Historic Trail. The Lewis and Clark trail, located near the southern boundary of the project area, traces the path taken by these explorers in 1805-06. It is anticipated that use of this trail will increase in the next year to celebrate Lewis and Clark's bicentennial crossing (personal communication, Bretz 2003). The Nez Perce Trail, crossing the northern portion of the study area, was a hunting route used by Native Americans.

Access to Lolo Creek is by Forest Service Roads 100 and 500. The Kamiah-Pierce Road 100 is an arterial route that extends from U.S. Highway 12 at Kamiah to Road 250 near Pierce (2001 Clearwater National Forest Map, 1:26720). Road 100 is the main access road to the Clearwater and Lolo Creek drainage, and it runs parallel to Lolo Creek in the lower portion of the study area. It is also designated as Forest Highway 55. Road 100 provides access to the western portal of the historic Lolo Motorway. Lolo Trail Road 500 is a main road that extends from Road 100 east to U.S. Highway 12. Beyond Canyon Junction, Road 500 becomes a primitive native surfaced road known as the Lolo Motorway within the Lolo Trail National Historic Landmark. The road parallels the route of the Lewis and Clark expedition and is not suited for passenger car use. It is anticipated that it will be the primary road used by forest visitors celebrating the bicentennial of the Lewis and Clark expedition, and the Forest Service may implement a permit system to control access. Forest Road 103, which parallels Lolo Creek in the upper portion of the study area, is also considered a high use recreation road to access the area. This road can also access the Lewis and Clark National Historic Trail and the Nez Perce National Historic Trail.

Only one developed campsite is located in the vicinity of the study area. The Lolo Creek Campground is a non-fee campground with seven units. It has a vault toilet and fire rings. The campground is on a double terrace, with the creek on the lowest third terrace. Other small dispersed camping sites are located throughout the project area, including on mining claims. These areas are primitive (i.e., no amenities) and are generally used by hunters and miners in the area. The Lolo Creek area is also popular for day users to pick berries, look for firewood and general picnicking. Peak use is during the summer months, with the hunting season extending from late August to early November.

3.2.8 Visual Resources

Visual resources are the natural (landforms, water bodies, vegetation) and anthropogenic (buildings, fences, signs) features that give a particular environment its aesthetic qualities. Attributes used to describe the visual resource value of an area include the number of visitors or viewers of an area or feature; the landscape character; the perceived aesthetic value or quality of the area or feature; and the uniqueness of the area or feature for particular visual qualities.

3.2.8.1 Forest Service Management of Visual Resources

The Forest Service assigns Visual Quality Objectives (VQOs) to manage scenic resources in the Clearwater National Forest. VQOs are the desired levels or degrees of acceptable alteration of the characteristic landscape, and range from the least evidence of development to very evident. VQOs include (USFS 1987):

- Retention: in general, human activities are not evident to the casual visitor.
- Partial Retention: human activities may be evident but must remain subordinate to the characteristic landscape.
- Modification: human activity may dominate the characteristic landscape but must, at the same time, utilize naturally established form, line, color, and texture. The activity should appear as a natural occurrence when viewed in foreground (0 to 0.25 miles from the viewer) and middleground (0.25 to 3-5 miles).

3.2.8.2 Lolo Creek Visual Resources

Lolo Creek sits in a river canyon and ridge system surrounded by forests. Views in the foreground of Lolo Creek consists of water forms, rock forms, very large boulders, deep pools, and gravel bars. Vegetation includes conifers, hardwoods, and shrubs; continuous vegetation is composed mostly of coniferous species interspersed with deciduous vegetation. Lolo Creek itself provides the only distinctive attraction. Other areas are scenic but common and do not provide a unique attraction to the area. The Lolo Creek area has not had a specific VQO assigned to it. Adjacent areas are managed for *Retention* in the foreground, *Partial Retention* in the middleground and *Modification* in the background (personal communication, Jones 2003).

The VQO for the Lewis and Clark National Historic Trail is *Partial Retention* Class B (A - Distinctive, B- Common, and C- Indistinctive). Management activities for this VQO should remain visually subordinate to the surrounding landscape. The landform, vegetation patterns, and water characteristics provide ordinary or common scenic quality. The VQO for the Lolo Creek Campground is also *Partial Retention.* The Nez Perce National Historic Trail has a VQO of *Retention* (USFS 1987); management activities focus on keeping the natural-appearing landscape with little or no development (personal communication, Jones 2003). Due to their proximity to historic trails, Forest roads 100 and 103 in the Lolo Creek drainage are managed in a similar fashion as other sensitive visual travel corridors: they are managed to have high visual sensitivity.

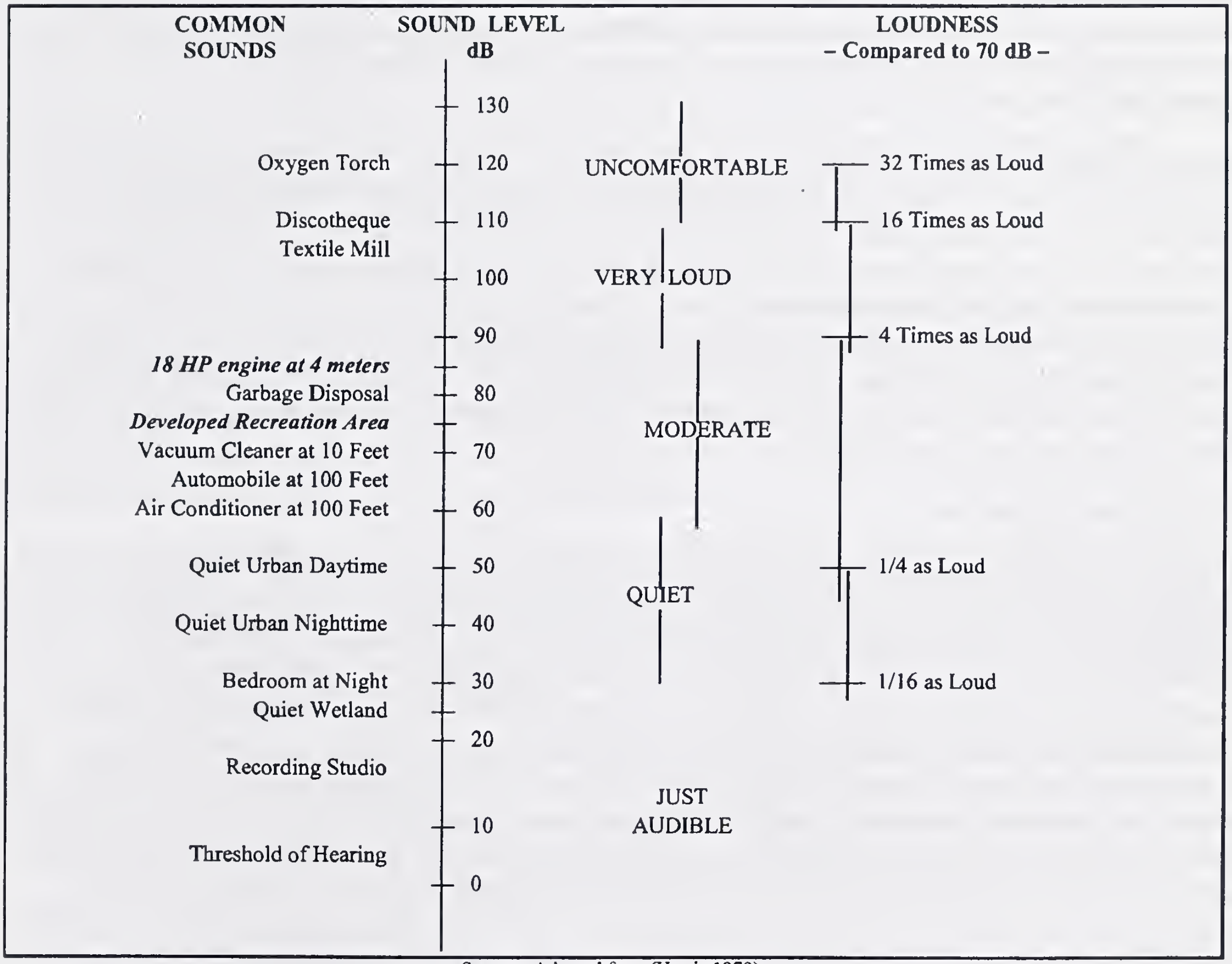
3.2.9 Noise

Noise is generally considered to be "unwanted" sound that interferes with normal activities or otherwise diminishes the quality of the environment. It may be intermittent or continuous, steady or impulsive. It may be stationary (such as a generator) or transient (aircraft overflight or passing vehicles). There is wide diversity in responses to noise; responses vary not only according to the type of noise and the characteristics of the source, but also according to the sensitivity and expectations of the receptor, time of day, weather, and distance between the noise source (e.g., a generator) and the receptor (e.g., a person or animal).

Sound-measuring instruments record instantaneous sound levels in decibels (dB). With these measurements, sound levels for individual noise events and average sound levels, in decibels, over extended periods of hours, days, months, or years can be calculated. When measuring community response to noise, it is common to adjust the frequency content of the measured sound to correspond

to the frequency sensitivity of the human ear. This adjustment is called A-weighting (ANSI 1988). Figure 3-4 shows A-weighted sound levels (in dB) from several typical sources (dB).

Natural noises would include flowing water, insects, birds, and other animals. There would also be noises from human activities, such as vehicles on the roads, recreational vehicle engines and power generators on the Lolo Creek Campground and/or on dispersed campsites, and aircraft. Background noise levels have not been measured in the Lolo Creek area. However, average noise levels could be expected to vary from 25 to 75 dB (Figure 3-4).



Source: Adapted from (Harris 1979).

Figure 3-4. Typical A-Weighted Sound Levels of Common Sounds

3.2.10 Socioeconomics

Clearwater National Forest is influenced by conditions occurring at national and regional levels. However, the local area would most affect activities in the Forest, and be most affected by activities in the Forest. Visitors to the Forest come from across the country, but a large majority reside in the Pacific Northwest. Most visitors reside in north and north-central Idaho and northeast Montana, with fewer visitors from increasing distances.

The nearest sizable city to Lolo Creek is Orofino, Idaho, the county seat of Clearwater County. This would be the economic area most affected by activities in Lolo Creek. In 2000, the total population of Clearwater County was 8,930, and residents had a per capita of income of $15,463 (U.S. Department of Commerce 2001).

The amount of gold recovered is estimated annually in the *Clearwater National Forest Monitoring and Evaluation Report*. However, the actual amount of gold recovered by small-scale suction dredging in Lolo Creek is not known; thus, it is not known what contribution suction dredging may make to individual or county income or to the local or regional economies. Several of the dredge operators state that the gold recovered supplements their income. Only one of the prospective operators is known to rely on suction dredging as their sole source of income, or even as a major source of income. Although no revenues accrue to the United States, miners have argued that their suction dredging activities bolsters local economy through their purchasing of equipment, food, and gasoline.

3.2.11 Heritage Resources

Heritage resources are any prehistoric or historic district, site, building, structure, or object considered important to a culture, subculture, or community for scientific, traditional, religious or other purposes. They include archaeological resources, historic architectural resources, and traditional resources. Archaeological resources are areas where prehistoric or historic activity measurably altered the earth or where deposits of physical remains (e.g., projectile points, pottery, etc.) have been discovered. Architectural resources include standing buildings, districts, bridges, dams, and other structures of historic or aesthetic significance. Traditional resources can include archaeological resources, structures, neighborhoods, prominent topographic features, habitats, plants, animals, and minerals that Native Americans or other groups consider essential for the preservation of traditional culture. Significant heritage resources can be eligible for, or listed in, the National Register of Historic Places (NRHP), or may be identified by Native American groups as important in maintaining their cultures, i.e., Traditional Cultural Properties. Native American treaty rights and traditional uses are described in more detail in Section 3.4.

3.2.11.1 Historical Setting

Aboriginal land use of the project region probably dates to at least 10,000 years ago, although this early period is not completely understood for the Clearwater Region (USFS 2002e). Inhabitants are likely to have lived in small groups, using a diversity of canyon and upland floral and faunal resources (including large game animals) as encountered. Tools included short-bladed projectile points, knives, and scraping tools. As the climate gradually warmed, the population increased, and shifts in subsistence practices are represented by small campsites along the rivers and streams of the region. Game such as deer, elk, rabbits, birds, and fish were taken locally, and plant use increased. Tool types increased in variety and included dart points and food processing tools such as ground cobbles and pestles. After about 3,500 years ago, pithouse villages became more common. Bow

and arrow technology was introduced approximately 1200 years ago. Deer, elk, and bison, among other large game, were hunted as locally available. Semi-permanent villages were established in the Clearwater River region. The larger dart points of earlier periods were replaced with small arrow points, and major root processing is represented by large mortars and digging sticks. After the introduction of the horse to many (though not all) Plateau groups between 300 and 400 years ago, mobility increased and dwellings shifted to more portable structures (USFS 2003f).

At the time of the arrival of Euroamericans in the region in 1805, the Nez Perce people occupied villages in the Clearwater River region, among other areas (USFS 2002e). Traditional Nez Perce territory in the Clearwater, Snake, and Salmon River basins provided game animals, plants and fish resources. Estimates suggest that the majority of Nez Perce resource use focused on the acquisition of fish, including chinook, coho, chum, steelhead, sockeye salmon, and lamprey. Non-anadromous fish included dolly varden, lake and cutthroat trout, squawfish, suckers and sturgeon. Plant resources included camas and couse, among many others. Section 3.4 provides a more detailed description of Nez Perce use of plant and animal resources.

Lewis and Clark's Corps of Discovery expedition entered the region along the Lolo Trail in 1805. Between 70 and 130 Nez Perce villages are estimated to have been located in the river basins of central Idaho when Lewis and Clark came through (USFS 2002e). The trail, known as *Khoo-say-na-is-kit* by the Nez Perce, was used by Native Americans to travel to and from buffalo country. In the 1830s, the trail was used by fur traders, and in the 1850s was investigated by John Mullan for its potential as a military trail. Today, the Lolo Trail and the Lewis and Clark National Historic Trail are part of the Lolo Trail National Historic Landmark.

As Euroamerican settlers moved into the region following initial exploration, settlers and miners began to encroach on the Nez Perce homeland. In 1855, Isaac Stevens, the governor of the newly formed Washington Territory, called the Nez Perce leaders to a council at Walla Walla to create a reservation. An agreement was reached that reserved most of the traditional Nez Perce homeland (7.7 million acres) as their exclusive domain.

In 1860, gold was discovered on the Nez Perce Reservation at a location which would become known as Orofino Creek (Hoggatt 1997). The discovery of gold created a rush to the Nez Perce Reservation. By 1863, the U.S. government was unable to control Euroamerican incursions into Nez Perce lands and negotiated a second treaty, dramatically reducing the size of the reservation that had been established in 1855 (Hoggatt 1997).

Eventually the U.S. government directed all non-treaty Nez Perce to move onto the reservation. On the way to the reservation, young warriors (independent of the Nez Perce leadership) sought out specific settlers to avenge the deaths of certain Nez Perce people (Hoggatt 1997). The outbreak of violence ignited the Nez Perce War of 1877. The route of the non-treaty Nez Perce as they fled U.S. military forces across the Northwest was memorialized as the Nez Perce (or Nee-Me-Poo) National Historic Trail in 1986 (USFS 2003f) and is part of the Lolo Trail National Historic Landmark. The Nez Perce trail began in Oregon and led eastward over the Lolo Trail and into Montana (USFS 2003f). Musselshell Meadows, just west of the Lolo Creek study area, was the location of a Nez Perce camp along the trail.

Initial mineral explorations in the region did not locate gold in the North Fork Clearwater River drainage. However, after 1860, when gold was found on Orofino Creek and the Lolo Trail was improved as a route into the region, the search for gold intensified. Mining north of the town of Pierce also extended into some North Fork streams, although those placers did not compare with

Orofino Creek (ISHS 1981). Lolo Creek and its tributaries became hosts to mining beginning in the late 19th century and continuing through the 20th century.

In the early 1900s, large-scale commercial logging began to gain importance in the Clearwater region (ISHS 1981). New towns such as Headquarters and Elk River grew up in association with logging (CHM 2003). Logging continued throughout the 20th century. USFS operations became prominent in the region after 1906. The Bitterroot Forest Reserve in Idaho and Montana was established in 1897, and in 1907 part of the Bitterroot Forest that included the Lolo Trail became the Clearwater and Lolo National Forests (USFS 2002e). The Clearwater National Forest continues to manage the project region today.

3.2.11.2 Identified Heritage Resources

Heritage resource inventories in the Lolo Creek study area began in the 1970s and continue into the present, although the immediate project area has not been surveyed completely. There has been no recent survey or heritage inventory on the north or west banks of Lolo Creek, or on the east bank of the creek between Nevada Creek and the Lewis and Clark National Historic Trail to the south.

Records of the Idaho State Historic Preservation Office (SHPO) identify 14 previously recorded resources in the Lolo Creek study area, including the Pioneer Quartz Mine and mining road; Nez Perce camp locations; the location of the NRHP-eligible Pioneer Quartz Mine (10CW191) on Dutchman Creek, initially used from 1897 through 1903; USFS lookouts (Austin Ridge and Lolo Forks); and historic cabins and mining features. Until a formal determination of National Register eligibility is made, all recorded and unrecorded heritage resource sites are treated as eligible for nomination to the NRHP.

Portions of the Lolo Trail National Historic Landmark also lie within the project area. This nationally designated historic landmark contains portions of the route used by the Lewis and Clark expedition as they crossed the Rocky Mountains in 1805 and 1806; segments of the trail used by the Nez Perce and U.S. Army during the war of 1877; and a route used by Native Americans to travel to the plains of Montana for buffalo hunting. The Nez Perce (Nee-Me-Poo) National Historic Trail passes through the Lolo Creek study area in the vicinity of Siberia and Dutchman Creeks. The Lewis and Clark National Historic Trail crosses the southern tip of the study area in the vicinity of Lolo Campground. Both of these trails are part of the Lolo Trail National Historic Landmark. Many other heritage resources are recorded immediately west of the study area in the Musselshell Creek vicinity where there are Native American camps, trails, homesteads, a sawmill, and an historic USFS work center.

Traditional Native American resource locations occur in the vicinity of the Lolo Creek study area. The camas collection areas associated with Musselshell Meadows lie to the west, and just outside, the study area. Within the study area are the Nez Perce (Nee-Me-Poo) National Historic Trail, and streams and tributaries connected to salmon production. The Nez Perce Tribe has identified salmon as an integral part of tribal religion, culture, and physical sustenance, and has indicated that the annual return of the salmon allows the transfer of traditional values from generation to generation (Columbia River Inter-Tribal Fish Commission [CRITFC] 2002). The Nez Perce Tribe has indicated that Lolo Creek is an important stream in their restoration efforts for chinook salmon in the Clearwater River Subbasin (Mancuso 1996). The Yoosa Creek tributary of upper Lolo Creek, which is just outside the study area, is the location of a satellite facility site for the Nez Perce tribal hatchery program. The USFS has maintained contact with the Nez Perce Tribe to identify potential traditional resource concerns in the Lolo Creek study area.

In November of 2001, the Nez Perce Tribal Ethnographer, Josiah Pinkham, identified six traditional gathering areas in the Lolo Creek area, one of which is on the bank of Lolo Creek. Additional areas, yet to be identified, could also lie within the Lolo Creek study area. The exact location of traditional areas is considered confidential and is generally not publicized; for that reason, they are not identified here.

3.3 Moose Creek

3.3.1 Watershed Description

Moose Creek is a major tributary of lower Kelly Creek, which is itself a major tributary of the upper North Fork Clearwater River (see Figure 1-1 in Chapter 1). Independence Creek and Deadwood Creek are two major tributaries of Moose Creek within the EIS study area. There are approximately 34.3 miles of perennial streams within the project area; Moose Creek runs for 10.2 miles through the study area (including 0.6 miles through private land), Independence Creek for 5.1 miles (1.3 miles through private land), and Deadwood Creek for 3.8 miles (all on National Forest System lands). (See Figure 2-1.)

The entire Moose Creek watershed covers 66 square miles (USFS 1994a), of which 19.3 square miles are within the study area. Of the 19.3 square miles, the Independence Creek and Deadwood Creek watersheds are 5.4 and 3.4 square miles, respectively.

Over half (about 61 percent) of the Moose Creek watershed is considered undeveloped, but other parts of the drainage, including the study area for this EIS, have undergone extensive mining, road construction, and timber harvest on USFS and private lands. Both Deadwood Creek and Independence Creek were heavily placer mined beginning in the 1860s and continuing to the 1950s. Both dragline dredging and hydraulic mining were employed. Moose Creek was mined with a dragline in the 1940s, and 1950s. Dragline mining took place on Moose Creek above Independence Creek for approximately three miles from the mouth to approximately two miles above the Deadwood Creek confluence. Figure 3-5 shows a dragline in operation along Moose Creek in the 1950s. Some areas of the Moose Creek watershed were privately owned until 1996, when most private lands, with the exception of four patented mining claims parcels, were transferred to the USFS. Two of the patented claims are in the study area, including 98 acres along 1.3 miles of Independence Creek and 36 acres along a 0.6 mile segment of Moose Creek.

(Source: Manchester and Sievers 1957)

Figure 3-5. Dragline and Washer Operation on Moose Creek

Idaho DEQ has listed several beneficial uses for the North Fork Clearwater River, including domestic water supply, agricultural water supply, cold-water biota, salmonid spawning, primary contact recreation, secondary contact recreation, and special resource waters (IDEQ 2000). The Forest Plan for the Moose Creek and Deadwood Creek watersheds identifies cutthroat trout as an indicator species (USFS 1987), and cutthroat are also known to occur in Independence Creek. No stream segments within the Moose Creek study area have been identified by Idaho DEQ as having water quality concerns.

3.3.1.1 Deadwood Creek

Past activities in the Deadwood Creek watershed include mining, road building, and timber harvest. Mining was primarily in the floodplain, and activities such as dredging and the use of flash dams for hydraulic mining altered channel characteristics, channel stability and substrate composition. Clearwater National Forest 1993 data and 2003 GIS acreage show that the Deadwood Creek watershed had a road density of 2.3 miles per square mile (USFS 2003c). Many of the roads were built using inslope construction, which impacted the natural drainage and sediment delivery of the watershed. Intermittent timber harvesting conducted from 1968 through 1977 and timber regeneration cut acres total 600 acres, which amounts to 29 percent of the watershed (USFS 1994a).

3.3.1.2 Independence Creek

Past activities in the Independence Creek watershed were the same as in Deadwood Creek: mining, road building, and timber harvest. Mining was primarily in the creek itself and the floodplain adjacent to the creek and its tributaries. Activities such as dredging and the construction of stream diversions altered channel characteristics and channel stability (USFS 1994a). Clearwater National Forest 1993 data and 2003 GIS acreage show that Independence Creek watershed has a road density of 5.9 miles per square mile (USFS 2003c). Many of the roads were constructed using inslope construction, which impacted the natural drainage and sediment delivery of the watershed. Forest Service road 5440 crosses Independence Creek at an unimproved ford just above the confluence with Moose Creek (see Figure 2-3).

Sediment is delivered to first and second order streams from eroding cutslopes, ditches, and from road surfaces. A diversion that was built to divert water from the East to the West Fork of Independence Creek causes significant erosion from the hillslopes that were cut during construction. Tree harvesting within riparian areas reduced potential large woody debris, decreasing the creek's ability to store and trap sediment. Timber harvesting and broadcast burning began in 1959 and continued until 1982 (USFS 1994a). There were intermittent timber harvests and timber regeneration cuts on 2,370 acres, which amounts to 68 percent of the watershed.

3.3.1.3 Moose Creek

Most past activities in the Moose Creek watershed were in the Deadwood, Independence, and Osier Creek watersheds; the first two are described above and the last is not in the study area. Along Moose Creek itself, dragline mining occurred from the mouth of Moose Creek to approximately two miles above the Deadwood Creek confluence. The dragline greatly impacted the channel, which continues to show the effects. Streambanks remain unstable and a majority of the original channel substrate has been sorted and moved by the dragline activities. Clearwater National Forest (USFS 1994a) reported that the one major road adjacent to Moose Creek has not disrupted the natural

drainage of the watershed. There are 158 miles of road at a density of 2.2 miles per square mile in the watershed. Timber harvesting and broadcast burning were also conducted in the Moose Creek watershed between 1958 and 1988. The Forest Service acquired 4360 acres of the watershed from Potlatch Corporation in a 1996 land exchange in the Moose Creek drainage. Timber was harvested and roads were constructed on an estimated 3360 of the acquired land. A total of 4853 acres was also harvested and broadcast burned on National Forest land (USFS 2003c). The sum of the aquired land and remaining harvested and broadcast burned Forest lands amounts to 17.7 percent of the watershed (See Appendix C).

3.3.2 Geomorphology

3.3.2.1 Deadwood Creek

The Deadwood Creek watershed is primarily made up of the following land types, each of which is described below: glaciated lands, colluvial and frost churned uplands, and fluvial lands (USFS 1994a).

Glaciated lands are characterized by steep, high elevation, rocky peaks and ridges that were shaped by glaciation. Slopes are frequently above 60 percent. Cirque basins are common above 5,500 feet. Streams range from being weakly entrenched in bedrock with moderately steep gradients to gentle, weakly entrenched low gradient streams in valley floors.

Many streams originate in colluvial and frost churned uplands and are located on debris above bedrock with moderately steep gradients. This land group sustains stream flow from ground water throughout the year. Water yields average 60 to 85 percent of precipitation at higher elevations and 40 to 75 percent at lower elevations.

Geomorphologically, fluvial lands represent a progression from the higher relief landforms with generally seep gradient streams to lower relief, rolling hill-type topography. Streams in this land type have low gradients and meandering channels are common.

Deadwood Creek has predominantly B3 and B4a channel types as defined by the Rosgen (1994) method (USFS 1994a). Table 3-1 characterized the various channel types. In general, Type B channels are dominated by riffles with some reaches containing “rapids” and infrequently spaced scour-pools at bends or areas of constriction. The letter “a” denotes a creek with a gradient of 10 percent and above. Studies conducted on two reaches within the stream rated Deadwood Creek as having “fair” stability (USFS 1994a) and low levels of cobble embeddedness (USFS 1995).

Data are not available describing the particle size distribution of the substrate within Deadwood Creek. However, past activities would suggest that a relatively higher proportion of the substrate could be fine sediments (those by definition that are less than 4 mm in size) as compared to an undisturbed watershed with similar geology. USFS (1994a) indicates that Deadwood Creek is an energy limited system, suggesting that sediments produced in the watershed would have a tendency to fall out and collect in the bottom of the channel until high flow events occur. However, the low levels of noted embeddedness may suggest that fine sediments have been transported out of the stream from large flow events.

3.3.2.2 Independence Creek

The Independence Creek watershed is dominated by colluvial and frost churned uplands, and fluvial lands (USFS 1994a). The general geomorphologies of these land-types were described for Deadwood Creek above.

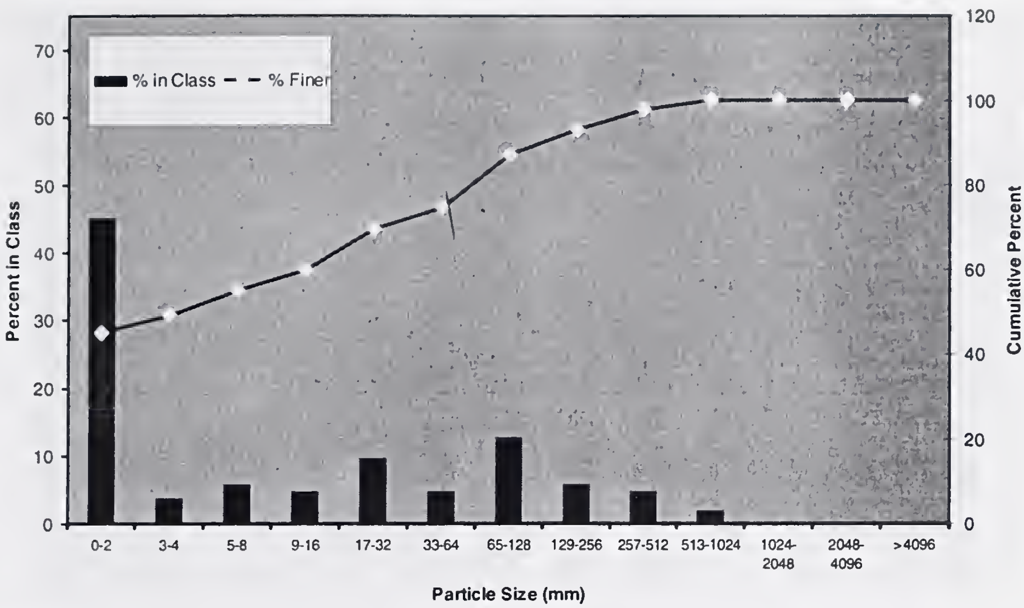
Independence Creek has stream reaches with a broad range of types as defined by the Rosgen (1994) system (USFS 2002a). Stream reaches have been surveyed to have the following range of types: A2, A4, A5, A6, B3, B4, B5, G5 and G6. These stream types are characterized in Table 3-1. Studies conducted on twenty reaches within the stream rated Independence Creek as having "fair" to "poor" stability (USFS 1994a) and moderately high levels of cobble embeddedness (USFS 1995).

Data are available from one cross-section describing the particle size distribution of the substrate within Independence Creek (USFS 2003e). Figure 3-6 depicts results from pebble counts showing the percent distribution for several particle size classes. Percent distribution is shown by size class and as an accumulated percentage. These data show a moderately high proportion of the substrate consists of fine sediments in the 0-2 mm size class. These data confirm probable impacts from past activities, such as mining and timber harvests. USFS (1994a) further indicates that Independence Creek is an energy-limited system, which suggests that fine sediments produced in the watershed would have a tendency to fall out and collect in the bottom of the channel until high flow events occur. Studies conducted on two reaches within the stream rated Independence Creek as having "fair" stability (USFS 1994a) and low levels of cobble embeddedness (USFS 1995).

3.3.2.3 Moose Creek

The Moose Creek watershed is dominated by glaciated lands, colluvial and frost churned uplands, and fluvial lands (USFS 1994a). The general geomorphologies of these land-types were described for Deadwood Creek above.

Two stream reaches surveyed by Clearwater National Forest both show Moose Creek with a B3 channel type as defined by the Rosgen (1994) system (USFS 1994a) (Table 3-1). Type B channels are dominated by riffles with some reaches containing "rapids" and infrequently spaced scour-pools at bends or areas of constriction. The number 3 denotes a substrate that is predominately composed of cobbles. Studies conducted on these two reaches within the stream rated Moose Creek as having "fair" stability (USFS 1994a) and low levels of cobble embeddedness (USFS 1995).



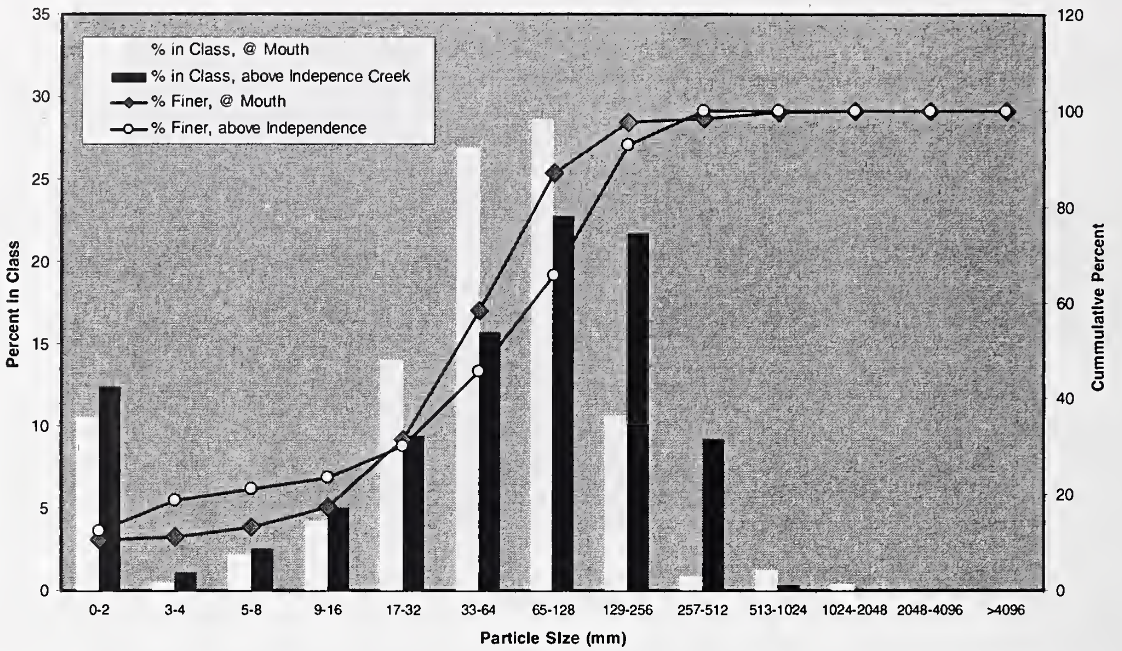
(Source: USFS 2003e)

Figure 3-6. Particle Size Distribution of Independence Creek Substrate Materials

Data are available from two reaches describing the particle size distribution of the substrate in Moose Creek (USFS 2003e). These reaches were surveyed using the Wolman pebble count method (Wolman, 1954). One surveyed reach was on Moose Creek near the mouth and one reach was surveyed above the Independence Creek confluence. Figure 3-7 depicts results from pebble counts showing the percent distribution for several particle size classes. Percent distribution is shown by size class and as an accumulated percentage. These data show a moderately high proportion of the substrate consists of fine sediments in the 0-2 mm size class. These data confirm probable impacts from past activities, such as mining and timber harvests. However, USFS (1994a) indicates that Moose Creek is an energy-surplus system. This suggests that fine sediments produced in the watershed would have a tendency to be transported out of the watershed. An energy-surplus stream also has the potential to impact channel morphology through scouring of the bed and erosion of the banks during very high flows.

3.3.3 Stream and Sediment Discharge

Clearwater National Forest applied a flow-sediment yield model (WATBAL) to evaluate sediment yields and hydrologic response of the Moose Creek watershed including the Deadwood Creek and Independence Creek tributaries (USFS 1994a). The WATBAL model is designed to simulate the potential and most likely effects of forest management practices, such as timber harvest, road construction, or fire on watershed hydrology and sediment yield.



(Source: USFS 2003e)

Figure 3-7. Particle Size Distribution of Moose Creek Substrate Materials

3.3.3.1 Deadwood Creek

Sediments produced in the Deadwood Creek watershed from logging and road construction tend to deposit in the channel. Natural sediment production was estimated at 18 tons per square mile per year (USFS 1994a). This would be considered the average rate of erosion and sediment transport through an undisturbed natural system. The sediment yield from the watershed was 9 percent over "natural" in 1994 and 5 percent over "natural" projected for 2003 (USFS 1993a).

The Forest Plan standard for Deadwood Creek is a B channel type (see Table 3-1), cutthroat high fishable[7] stream (USFS 1987). The approximate maximum sediment loadings that generally support this criterion are 55 percent over "natural." Sediment production should be at or below 45 percent over natural for 20 out of 30 years. Based on this analysis, Deadwood Creek is currently meeting standards established by the Forest Plan.

In 2003, Equivalent Clearcut Acres amounted to 5.3 percent in the Deadwood Creek watershed. WATBAL showed a peak flow increase of 3 percent over natural for 2003 (USFS 2003e). This is less than the level of 15 to 20 percent that is considered to be potentially detrimental to the stream system (USFS 2001b).

Stream discharge, suspended sediment, turbidity, and bedload were studied on Deadwood Creek in 1981 (USFS 1993b). Table 3-13 provides average monthly data. Bedload is a measurement of sediment and larger size particles that move by jumping/bouncing, rolling, or sliding along the stream bottom. Bedload can be added to the suspended load to determine the total sediment load for a stream. These limited data show a relatively high level of total sediment load in June (1,031

[7] "High fishable" is a water quality/fishery objective defined as the maximum short-term reduction of water quality that is still likely to maintain a fish habitat potential that can support an excellent fishery relative to the stream's natural potential, and that will provide the capability for essentially full habitat recovery over time (USFS 1987).

lbs/day) and July (1,045 lbs/day) compared to much lower levels in August (9.6 lbs/day). Turbidity levels ranged between 0.7 and 1.9 NTU which is well under the State turbidity standard of 50 NTU. Turbidity data show that sediment production in Deadwood Creek is meeting State water quality standards. These 1981 data represent a worse-case scenario for Deadwood Creek because stream discharge was at its highest above "natural" according to the WATBAL model (USFS 1994a). Relationships between mean monthly stream discharge and sediment load are depicted in Figure 3-8.

Table 3-13. Mean Stream Discharge, Suspended Sediment, Bedload, and Turbidity Measured on Deadwood Creek in 1981

Month	*Mean Discharge (cfs)*	*Mean Suspended Sediment Conc. mg/l*	*Mean Suspended Sediment Load lbs/day*	*Mean Bedload lbs/day*	*Total Sediment Load lbs/day*	*Turbidity NTU*
Oct	2.2	0.3	3	12	15	1.9
Nov	nm	nm	nm	nm	nm	nm
Dec	nm	nm	nm	nm	nm	nm
Jan	nm	nm	nm	nm	nm	nm
Feb	nm	nm	nm	nm	nm	nm
Mar	nm	nm	nm	nm	nm	nm
Apr	nm	nm	nm	nm	nm	nm
May	13.5	4.0	289	195	484	0.7
Jun	19.2	4.8	466	565	1,031	1.2
Jul	6.9	5.2	153	892	1,045	1.2
Aug	2.3	1.8	22	0	22	0.7
Sep	nm	nm	Nm	nm	nm	nm

Table adapted from USFS (2003e)
cfs = cubic feet per second.
mg/l = milligrams per liter
lbs/day = pounds per day
NTU = Nephelometric Turbidity Units
nm = not measured

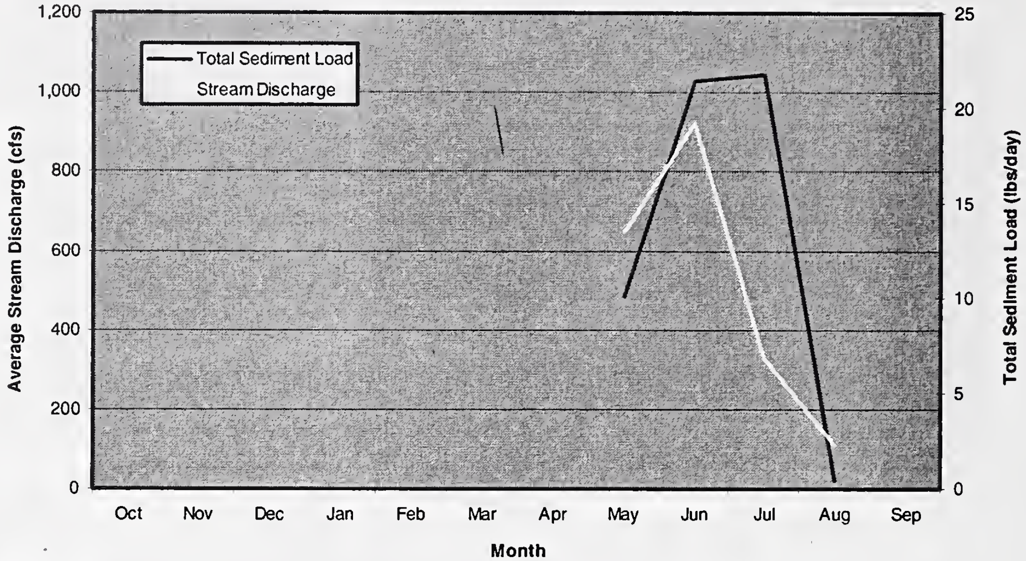
3.3.3.2 Independence Creek

Sediments produced in the Independence Creek watershed from logging and road construction tend to deposit in the channel, and surveys conducted noted high amounts of fine sediments in the channel (USFS 1994a). Natural sediment production was estimated at 17 tons per square mile per year (USFS 1994a). This would be considered the average rate of erosion and sediment transport through an undisturbed "natural" system. The sediment yield from the watershed was projected 33 percent over "natural" for 2003. USFS (1993b) reports that the 33 percent value was a large reduction in the amount of sediment yields that WATBAL estimated for the 1960s and 1970s, thus concluding that impacts associated with road construction and timber harvesting had mostly subsided.

The Forest Plan standard for Independence Creek is a B channel type (see Table 3-1), cutthroat moderate fishable[8] stream (USFS 1987). The approximate maximum sediment loadings that generally support this criterion are 150 percent over natural. The 33 percent level for 2003 is well

[8] "Moderate fishable" is a water quality/fishery objective defined as the maximum short-term reduction of water quality that is still likely to maintain a fish habitat potential that can support at least a moderate harvestable surplus relative to the stream's natural potential, and that will provide the capability for significant habitat recovery over time (USFS 1987).

below the Forest Plan standard that must be met for sediment production 10 out of 30 years. Based on this analysis, Independence Creek is currently meeting standards established by the Forest Plan.



(Source: USFS 2003e)

Figure 3-8. Relationship between Stream Discharge and Total Sediment Load for Deadwood Creek

In 2003, Equivalent Clearcut Acres amounted to 14 percent in the Independence Creek watershed (USFS 2003e). WATBAL showed a peak flow increase of 8 percent over natural for 2003. This is less than the level of 15 to 20 percent that is considered to be potentially detrimental to the stream system (USFS 2001b).

Stream discharge, suspended sediment, turbidity, and bedload were studied on Independence Creek in 1981. Average monthly data are provided in Table 3-14. These limited data show relatively high levels of total sediment load in June (1,441 lbs/day) and July (667 lbs/day) and low levels in August (27 lbs/day). Turbidity levels range between 1.1 and 5.2 NTU and are well under the State turbidity standard of 50 NTU above background (IDEQ 2000). Turbidity data show that sediment production in Independence Creek is meeting State water quality standards. These 1981 data represent a worse-case scenario for Independence Creek as stream discharge was at its highest above "natural" according to the WATBAL model (USFS 1994a). Relationships between mean monthly stream discharge and sediment load are depicted in Figure 3-9.

Table 3-14. Mean Stream Discharge, Suspended Sediment, Bedload, and Turbidity Measured on Independence Creek in 1981

Month	*Mean Discharge (cfs)*	*Mean Suspended Sediment Conc. mg/l*	*Mean Suspended Sediment Load lbs/day*	*Mean Bedload lbs/day*	*Total Sediment Load lbs/day*	*Turbidity NTU*
Oct	2.9	2.5	39	nm	39	5.2
Nov	nm	nm	nm	nm	nm	nm
Dec	nm	nm	nm	nm	nm	Nm
Jan	nm	nm	nm	nm	nm	nm
Feb	nm	nm	nm	nm	nm	nm
Mar	nm	nm	nm	nm	nm	nm
Apr	nm	nm	nm	nm	nm	nm
May	nm	nm	nm	nm	nm	nm
Jun	11.0	16.6	712	729	1,441	4.0
Jul	7.5	3.3	133	545	677	1.1

Aug	2.3	2.2	27	nm	27	1.2
Sep	3.1	nm	nm	nm	nm	Nm

Table adapted from USFS (2003e)
cfs = cubic feet per second.
mg/l = milligrams per liter
lbs/day = pounds per day
NTU = Nephelometric Turbidity Units
nm – not measured

3.3.3.3 Moose Creek

Based on WATBAL, sediments produced in the Moose Creek watershed from logging and road construction tend to be transported out of the watershed because of a relatively high energy system (USFS 1994a). Natural sediment production was estimated at 12 tons per square mile per year (USFS 1991). This would be considered the average rate of erosion and sediment transport through an undisturbed "natural" system. The sediment yield from the watershed was projected to be 0 percent over "natural" in 2003. USFS (1994a) reports that this is a large reduction in the amount of sediment yields that WATBAL estimated for the 1960s.

The Forest Plan standard for Moose Creek above the Independence Creek confluence is a B channel type, cutthroat high fishable stream (USFS 1987). The approximate maximum sediment loadings that generally support this criterion are 55 percent over "natural". The 2003 level of 0 percent is well below the Forest Plan standard that must be met for sediment production 10 out of 30 years.

In 2003, Equivalent Clearcut Acres (ECA) amounted to 4.8 percent in the Moose Creek watershed. WATBAL showed a peak flow increase of 3 percent over natural for 2003. This is less than the level of 15 to 20 percent that is considered to be potentially detrimental to the stream system (USFS 1991).

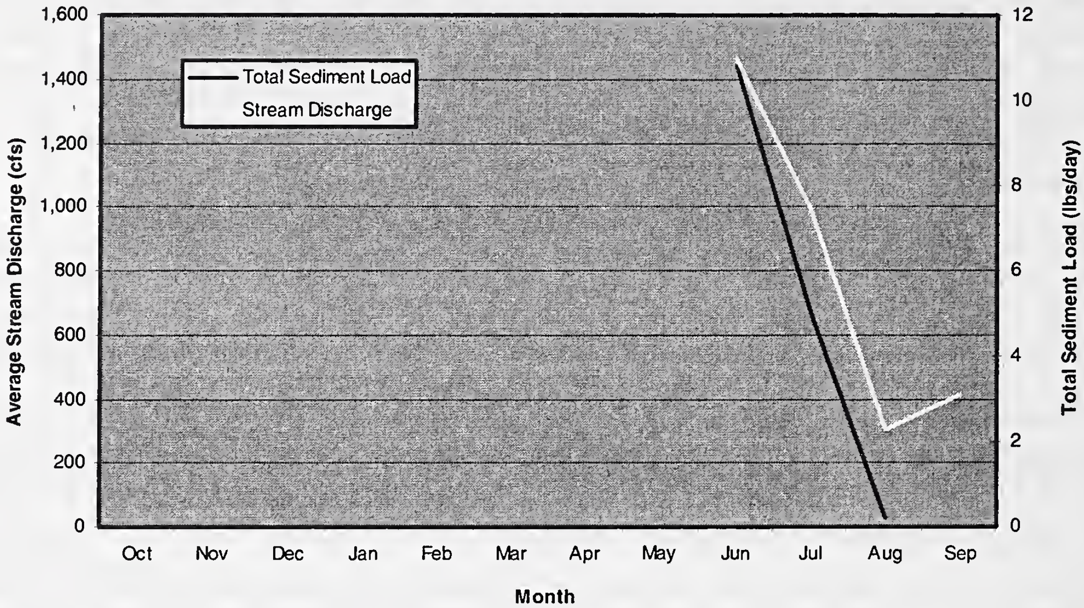
Stream discharge, suspended sediment, turbidity, and bedload were monitored on Moose Creek between 1979 and 1981. Average monthly values are presented in Table 3-15. These data show relatively low levels of suspended and total sediment load for most months. Turbidity levels range between 0.7 and 4.3 NTU and are well under the State turbidity standard of 50 NTU above background. Turbidity data show that sediment production in Moose Creek is meeting State water quality standards. Relationships between mean monthly stream discharge and sediment load are depicted in Figure 3-10.

Table 3-15. Mean Stream Discharge, Suspended Sediment, Bedload, and Turbidity Measured on Moose Creek in 1980-1981

Month	*Mean Discharge (cfs)*	*Mean Suspended Sediment Conc. mg/l*	*Mean Suspended Sediment Load lbs/day*	*Mean Bedload lbs/day*	*Total Sediment Load lbs/day*	*Turbidity NTU*
Oct	37	3	401	0	401	1.2
Nov	71	1.8	690	nm	690	4.3
Dec	nm	nm	nm	nm	nm	nm
Jan	nm	nm	nm	nm	nm	nm
Feb	nm	nm	nm	nm	nm	nm
Mar	nm	nm	nm	nm	nm	nm
Apr	539	9	25103	488	25591	2.3
May	420	5	11189	488	11677	1.1
Jun	352	4	7148	376	7523	1.4
Jul	163	7	5619	254	5872	1.8
Aug	66	2	767	nm	767	0.7

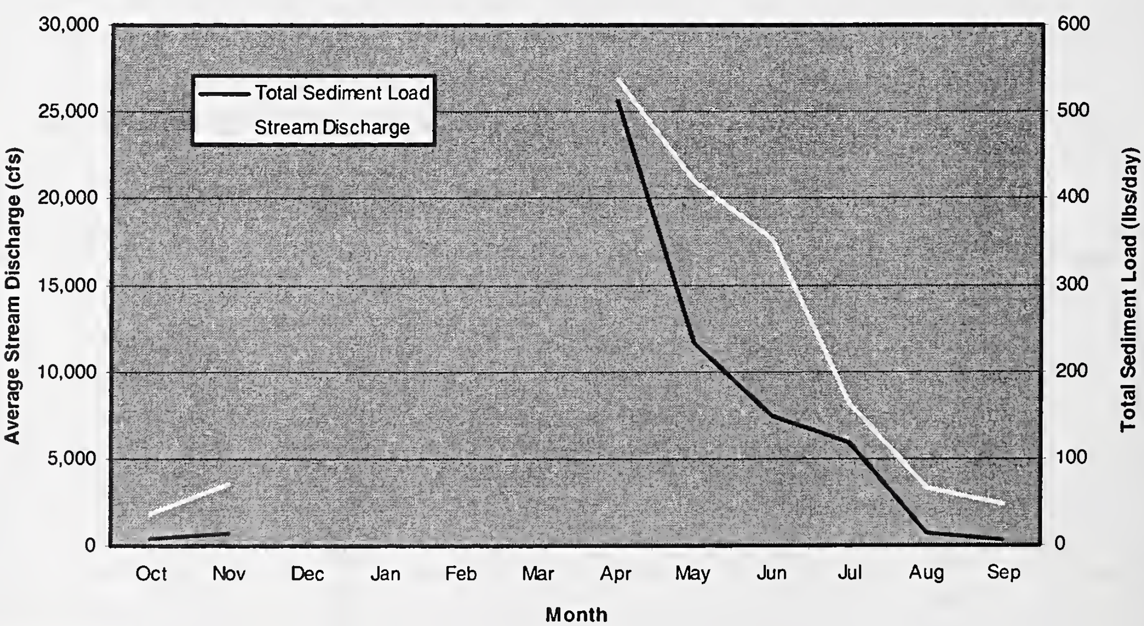
Sep	48	1	325	nm	325	1.6
Table adapted from USFS 2003e cfs = cubic feet per second. mg/l = milligrams per liter			lbs/day = pounds per day nm = not measured			

The relationship between stream discharge and sediment transport, depicted in Figure 3-9, is related to stream velocity. There are several factors, such as channel width, depth and slope that determine the velocity of a stream at any given flow rate and at any given point. However, the velocity of the water flowing in a stream generally increases with increasing stream flow.



(Source: USFS 2003e)

Figure 3-9. Relationship between Stream Discharge and Total Sediment Load for Independence Creek



(Source: USFS 2003e)

Figure 3-10. Relationship between Stream Discharge and Total Sediment Load for Moose Creek at Mouth

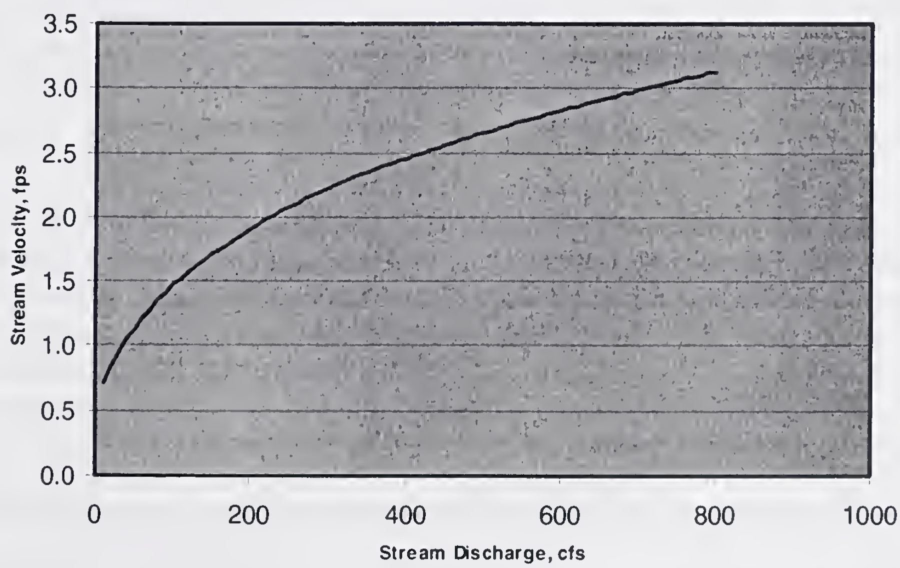
Increasingly higher velocities are required to dislodge, suspend, and transport increasingly larger sizes of sediment material. As flow velocity decreases, sediment particles settle out according to size. Sand and larger fractions drop out to the channel substrate until at lower velocities the stream has only enough energy to keep very fine sediments (i.e., silts and clays) suspended.

A relationship between stream discharge and stream velocity for a reach near the mouth of Moose Creek was estimated using cross-section survey data provided by USFS (2003e) and Manning's equation. This relationship is shown in Table 3-16 and Figure 3-11.

Table 3-16. Relationship between Stream Flow and Stream Velocity at the Mouth of Moose Creek

Month	*Average Stream Discharge cfs*	*Average Flow Velocity Flow Velocity Fps*
Oct	72	1.3
Nov	93	1.4
Dec	107	1.5
Jan	92	1.4
Feb	110	1.5
Mar	123	1.6
Apr	362	2.4
May	726	3.0
Jun	513	2.7
Jul	147	1.7
Aug	64	1.2
Sep	55	1.2

Table adapted from USFS (2003e)
cfs = cubic feet per second
fps = feet per second



(Source: USFS 2003e)

Figure 3-11. Relationship between Stream Flow and Stream Velocity at the Mouth of Moose Creek

3.3.4 Fisheries and Aquatic Organisms

3.3.4.1 Aquatic Habitat

Table 3-17 provides a summary of aquatic habitat characteristics in the Moose Creek, Independence Creek and Deadwood Creek project area. Habitat conditions vary along Moose Creek. Upstream of the Deadwood Creek confluence there are steep to very steep gradients and excellent fish habitat. Between the mouths of Deadwood Creek and Independence Creek, the gradient is moderately steep with habitat affected by past placer mining. Between the mouths of Independence Creek and Osier Creek, the gradient is moderately-steep to steep that repeatedly changes character in response to channel confinement. Downstream of Osier Creek, the size and sinuosity of Moose Creek increases in response to tributary inflows, reduced channel confinement, and a decline in stream gradient.

Table 3-17. Summary of Aquatic Habitat Characteristics in the Moose Creek Project Area [a]

Habitat Parameter	*Moose Creek*	*Independence Creek*	*Deadwood Creek*
Rosgen Classification (see Table 3-1)	42% A, 45% B, 13% C	B3-B5 100%	A2/A3 100%
Average Gradient	4.8 %	3.2 %	5.5 %
Stream Width	8.2 m	2.8 m	3.0 m
Stream Depth	0.198 m	0.133 m	0.123 m
Thalweg Depth	0.38 m	0.255 m	0.236 m
Bank Stability [b]	4.4 (Stable)	4.5 (Stable)	4.8 (Stable)
Cobble Embeddedness [c]	22.5 %	33.5 %	25.3 %
Pool:Riffle Ratio [d]	9 : 59	15 : 51	25 : 63
Acting Debris / Potential Debris [e]	6 / 20	17 / 20	23 / 72
Pool Quality	1.5 (Poor)	1.6 (Poor)	1.0 (Poor)
Instream Cover	1.6 (Sparse)	1.5 (Sparse)	1.3 (Sparse)
Bank Cover	1.3 (Sparse)	2.1 (Moderate)	1.6 (Sparse)

a = Averages from 1990 summer stream survey (Clearwater Biostudies, Inc. 1991)
b = Largely due to abundant vegetation and large channel/bank substrate.
c = The target cobble embeddedness rate for the Forest Plan should be less than 35 %.
d = The target pool:riffle ratio is 40:60 for Rosgen B channels and 50:50 for C channels
e = Acting debris = Pieces of in-channel wood per 100m. Potential debris = riparian conifers available for recruitment into the channel per 100 m. (Forest Plan recommends 40 pieces Acting and 80 pieces potential per 100 meters of stream)

Independence Creek is a moderately steep stream dominated by large substrate material. In-stream cover is sparse and bank cover is moderate. Deadwood Creek is a steep stream with sparse in-stream and bank cover conditions. Deadwood Creek has the greatest amount of woody debris among the three streams.

Table 3-18 provides the average percentages of material comprising the substrate in the Moose Creek project area. The data show that the substrate is dominated by cobbles, large rubble, and coarse gravel. This substrate provides limited spawning-sized gravels for salmonids and good fish rearing habitat. Table 3-19 summarizes the average percentages of spawning habitat for various fish within the Moose Creek project area, based on the 1990 habitat survey. The data indicate that less than one-half of one percent of the total stream habitat for the three creeks is available for salmonid spawning. This includes potential spawning habitat in both dredging and non-dredging areas.

Table 3-18. Average Percent Substrate Composition in the Moose Creek Study Area

Size Category	***Percent***		
	Moose Creek	*Independence Creek*	*Deadwood Creek*
Bedrock	1.6	0	0

Boulders (>30.5 cm)	8.0	12.5	1.3
Large rubble (15.2 – 30.5 cm)	33.3	8.0	17.9
Small rubble (cobbles, 7.6 – 15.2 cm)	47.7	34.3	53.0
Coarse gravel (2.5 – 7.6 cm)	6.5	32.6	20.0
Small gravel (0.6 – 2.5 cm)	1.3	8.8	5.8
Sand (<0.6 cm)	1.1	2.4	2.0
Silt	0.2	0	0
Muck	0.1	0	0
Organic debris	0.2	1.6	0
Source: Clearwater Biostudies, Inc. 1991	1.1	2.4	2.0

Table 3-19. Percent of Moose Creek Study Area Available for Spawning [a]

Fish	*Good*	*Fair*	*Poor*	*Total %*
Resident salmonid (spring)	0.13	0.16	0.07	0.36
Resident salmonid (fall)	0.11	0.12	0.05	0.28

a = Combined average for Moose Creek, Independence Creek, and Deadwood Creek based on habitat area.
Source: Clearwater Biostudies, Inc. 1991

3.3.4.2 Threatened, Endangered, and Sensitive Species

Chinook Salmon (*Oncorhynchus tshawytscha*). The Moose Creek drainage is located over 100 miles upstream of Dworshak Dam. The dam provides a complete migration barrier to anadromous fish, so chinook salmon do not exist in the Moose Creek project area.

Steelhead Trout (*Oncorhynchus mykiss*). The Moose Creek drainage is located over 100 miles upstream of Dworshak Dam. The dam provides a complete migration barrier to anadromous fish, so anadromous steelhead trout do not exist in the Moose Creek project area.

Bull Trout (*Salvelinus confluentus*). A limited presence of bull trout within the Moose Creek drainage has been documented by several sources. Overall, westslope cutthroat trout is the dominant species with low numbers of rainbow/steelhead trout and bull trout (Clearwater BioStudies Inc. 1991). Available bull trout population information is summarized in Table 3-20.

A few age 1+ and 2+ bull trout were found in Moose Creek below the confluences with Deadwood Creek and Independence Creek during a stream survey conducted in 1990 (Clearwater BioStudies, Inc. 1991). A re-survey of the 1983 survey by Moffitt and Bjornn (1984) by the IDFG (1998) did not find any bull trout at the stations in Little Moose Creek and Ruby Creek. The Osier Creek drainage was surveyed in 1995 with no bull trout observed (Isabella Wildlife Works 1996). No bull trout were observed during surveys on Ruby Creek, Craig Creek and the Little Moose Creek drainage in 1998 (Clearwater BioStudies, Inc. 1999b).

Table 3-20. Summary of Bull Trout Data Within the Moose Creek Drainage 1983-2001

Stream	*Number of Fish Population Stations*	*Number of Stations with Bull Trout*	*Bull Trout Age Classes and Densities*
Moose Creek – mainstem	28	7	Age 1 = 0.2/100m^2 * Age 2 + = 0.2/100m^2 Age 4 + = 1 fish ** Age 4 + = 3 fish ***

Table 3-20. Summary of Bull Trout Data Within the Moose Creek Drainage 1983-2001

Stream	*Number of Fish Population Stations*	*Number of Stations with Bull Trout*	*Bull Trout Age Classes and Densities*
Little Moose Creek [a, b, c]	17	3	
Swamp Creek	3	0	
Osier Creek (mainstem)	8	2	Age 4 + = 2 fish ****
Independence Creek	5	0	
Deadwood Creek [d]	2	0	
Ruby Creek [e]	4	1	Age 1 = 1.3/100m^2 Age 2 = 1.3/100m^2

* In Moose Creek, there were two stations with age 1 bull trout with a density of 0.2/100m^2.
** One adult bull trout observed in mainstem Moose Creek in 2000 directly downstream of Deadwood Creek.
***Three adult bull trout observed in mainstem Moose Creek in 2001; two downstream of Osier Creek and one upstream mouth
****Two adult bull trout observed in Osier Creek in 2001, downstream of Swamp Creek.

a = IDEQ survey on Little Moose Creek on 7/29/1998. During their electro-shocking, they captured one (age 4) bull trout (240 – 249 mm) approximately 0.25 miles upstream from the mouth.
b = The Nez Perce tribal fisheries program conducted a genetics survey on westslope cutthroat trout in Little Moose Creek in the summer of 1999. They captured a small bull trout (approx. 50 mm) about one mile downstream from Wapito Creek. They also noted a 3 yr. old bull trout natural mortality near their shocking site (USFS 2002b).
c = IDFG have three snorkel transects in Little Moose Creek that have been surveyed from 1994-1997. They observed no bull trout at these transects. (IDFG 1998)
d = Two stations snorkeled in 2000.
e = IDFG has one snorkel transect in Ruby Creek and have snorkeled this site from 1994-1997. They observed no bull trout during their surveys. (IDFG 1998)

All this data indicated that only limited bull trout spawning and rearing was occurring in the Moose Creek drainage prior to 2000. However, additional snorkeling surveys conducted during 2000-2001 found an increase in the numbers of adult bull trout in the Moose Creek drainage. Further, spawning has also been documented within the lower Osier Creek drainage. Moose Creek is proposed as critical habitat from its confluence with Kelly Creek upstream 9.5 miles to a gradient break near the headwaters (67 FR 71276 11/29/02).

Westslope Cutthroat (*Oncorhynchus clarki lewisi*) generally have a wide distribution and can be found in streams with channels as narrow as 18 inches. The highest densities are found in the small tributary streams, and in the mid and upper reaches of the larger streams where competition with other trout or salmon species is limited (USFS 1999). Cutthroat spawning occurs in pool tailouts and in runs in pockets of gravel with 0.5- to 2-inch diameter. Gravel pockets can be relatively shallow and still be adequate for egg incubation, which is why this species does so well in small or headwater streams. Rearing occurs in pools, along stream margins, and in pocket water habitats.

Spawning and rearing habitat is present in the Moose Creek study area for supporting populations of westslope cutthroat trout. This species was reported to be the dominant salmonid in the drainage, with densities averaging 2.8 (age 2+) fish per 100m^2 (Clearwater BioStudies Inc. 1990).

Pacific lamprey (*Lampetra tridentata*) do not occur in the Moose Creek drainage due to the presence of the Dworshak Dam.

Mountain whitefish (*Prosopium williamsoni*) prefer cold (8-10 °C) mountain streams with large riffles or pools averaging 3-4 feet in depth (Lusch, 1985). They are primarily bottom feeders with a preference for insects, snails, amphipods and crawfish. They have also been known to eat salmonid fry and eggs of its own kind. Whitefish are broadcast spawners and require a gravel bottom surface

on which the eggs will attach themselves. Mountain whitefish occur in very low numbers within the Moose Creek drainage (Clearwater Biostudies, Inc. 1999b).

Sculpins (*Cottus spp.*) generally prefer small cobble-sized substrate for breeding and non-embedded substrate in run/pool type habitats for cover. They are an important food source for other aquatic and terrestrial animals (USFS 2000). Sculpins exist in the Moose Creek drainage but the population size is unknown.

3.3.4.3 Other Aquatic Organisms

Aquatic Invertebrates. Aquatic insects are a primary food source of juvenile salmon and trout, and are a large part of the diet of resident adult trout and other coldwater fish. The presence, distribution, and abundance of aquatic invertebrates are dependent upon basic habitat conditions such as water temperature, water quality and chemistry, substrate, and flow. In general, the four most important aquatic insect groups or "orders" that comprise the diet of salmonids and many other fish include true flies (order *Diptera*), mayflies (*Ephemeroptera*), caddisflies (*Tricoptera*), and stoneflies (*Plecoptera*).

Macroinvertebrate survey data are not available for the Moose Creek drainage to determine if indices such as species diversity and abundance area within regional background stream conditions. However, the aquatic invertebrate community in streams in the Moose Creek study area could be expected to be abundant and diverse.

3.3.5 Wildlife

3.3.5.1 Wildlife Use

Birds. Riparian forests and wetlands along the Clearwater River and larger tributaries provide perching and nesting opportunities and concentrated prey for raptor species. Bald eagles are discussed in Section 3.3.5.2. Osprey nest along the corridors of the mainstem rivers of the Clearwater basin and although there may be some transitory use of Moose Creek, Independence Creek, or Deadwood Creek, but are not known to nest there. Marsh hawks use meadow areas located in the watershed. These birds feed mostly on rodents (Asherin and Orme 1978).

Blue heron forage and nest along mainstem rivers. Occasionally, they are observed in the larger tributaries of the upland drainages. Kingfishers and dippers are relatively common in area tributaries foraging on aquatic insects and fish, and nest in streambanks or nearby slopes. Waterfowl may temporarily use the riparian habitats during migrations.

Blue and ruffed grouse make transitory use of upland riparian habitats. Other upland game birds such as Ruffed Grouse and Blue Grouse, and may occasionally use the riparian habitats in the Moose Creek watershed.

Mammals. Aquatic fur bearers such as beaver, muskrat, fisher, mink, and river otter occur in Clearwater River corridors and in upland watersheds. In general, these animals depend on riverine areas, bays, ponds, tributaries, and riparian forests for den sites and foraging areas. Riparian zones also serve as dispersal, travel, and prey base corridors (Jones and Heinemeyer 1994). Beaver are found in the Moose Creek watershed. Beaver distribution is strongly related to the presence of riparian food sources such as cottonwood trees and willows plus protected areas such as sloughs, inlets, and ponds (Asherin and Orme 1978). Mink use slackwater habitats for foraging and denning. Fishers typically use mid-to-late successional forests and riparian zones. These forest types have

multilayered canopies which help regulate temperatures and provide suitable denning sites (cavities and downed logs). Raccoons frequent stream and riparian habitats and forage on fish and mussels found in the tributary streams.

Big game species such as white-tailed deer, mule deer, elk, black bear, cougar, and moose may occur in the project areas. These animals may use riparian corridors to move between summer and winter ranges and sometimes for calving and fawning. During severe winters, riparian habitats can provide cover necessary for survival.

3.3.5.2 Threatened and Endangered Wildlife

Four wildlife species in the Clearwater National Forest have been listed by the U.S. Fish and Wildlife Service under the Endangered Species Act as being endangered or threatened: gray wolf (listed as endangered), bald eagle (threatened), grizzly bear (threatened), and lynx (threatened). There are no grizzly bear in or near the Moose Creek drainages and they are not expected to inhabit the watershed. The potential occurrence of the remaining three species within the study area is as follows:

- Bald Eagle (*Haliaeetus leucocephalus*). No historical or current evidence documents nesting or breeding on the Clearwater National Forest. Bald Eagles neither nest nor forage in the Moose Creek project area. Essential habitat for bald eagles on the Clearwater National Forest is restricted to 0.5 miles on either side of the Lochsa River, Middle Fork of the Clearwater River, North Fork of the Clearwater River, and lower portions of the Weitas, Kelly, and Cayuse Creeks. Wintering eagles have been observed downstream on the North Fork Clearwater River and mainstem Clearwater River.
- Gray Wolf (*Canis lupus*). The Moose Creek drainage is within the boundary of the Central Idaho nonessential population area for the gray wolf. However, there have been no confirmed observations of breeding pairs, pack formation, young pups, denning, or suspected rendezvous sites within the project area.
- Lynx (*Lynx canadensis*). The Moose Creek project area is within Lynx Analysis Unit 12 and 13. Nine lynx sightings were recorded in Clearwater County between 1942 and 1995 (USFS 2002d). The Moose Creek project area does not contain suitable lynx denning habitat (USFS 1999).

3.3.5.3 Forest Service Sensitive and Management Indicator Species

Table 3-11 provided a list of the sensitive wildlife and management indicator species and their likely occurrence in the Moose Creek project area. Many of the wildlife species listed in Table 3-11 may occasionally occur in the riparian zone of Moose Creek. The following species are considered not likely to occur in the riparian areas due to habitat preferences and lack of documented occurrences: wolverine, Townsend's big-eared bat, flammulated owl, black-backed woodpecker, Harlequin duck, and the northern leopard frog.

3.3.6 Vegetation

3.3.6.1 Riparian Vegetation

The riparian habitat along Moose Creek varies considerably but is comprised mostly of mixed shrubs with alder, spruce, and mixed conifer trees. Mature conifers (e.g., spruce, lodgepole pine, grand fir, and Douglas fir) generally dominate along upper reaches of the creek, and deciduous species (alder,

cottonwood, and willow) usually dominate in the lower reaches of the creek. Alder and spruce are the dominant canopy species, followed by mixed conifers and willows. Associated understory species include huckleberry, dogwood, forbs, grasses, and meadow communities.

The riparian canopy in Independence Creek is dominated by alder, followed by spruce and mixed conifers. Forbs/grasses, mixed shrubs are the dominant understory along with young conifers.

Deadwood Creek is dominated by spruce, mixed conifers, cedar grand fir and alder trees. Understory vegetation along the streams is comprised of mixed shrubs, forbs/grasses, and small alder.

3.3.6.2 Forest Service Sensitive Plant Species

Table 3-11 provided a list of the sensitive plant species and their likely occurrence in the Moose Creek project area. Of the twelve sensitive riparian plants listed in Table 3-11, seven of them (deer fern, Mingan moonwort, green bug-on-a-stick, Henderson's sedge, light moss, short-styled triantha, and Idaho strawberry) could occur in the Moose Creek project area, although no populations have been reported.

3.3.7 Recreation

Section 3.2.7 described recreational resources in Clearwater National Forest, and how the Forest Service manages these resources.

Moose Creek is managed as Roaded Natural (see Section 3.2.7 for description of this management category). The natural settings with limited road access and campsites provide more of a semi-primitive recreational experience than at Lolo Creek. Moose Creek, due to its more remote location, has fewer visitors than Lolo Creek.

Recreational opportunities in the Moose Creek area include fishing, hunting, camping, and hiking, as well as suction dredge mining. Camping is the primary recreational activity in the area. Since many streams in the Clearwater region, including Kelly Creek, contain trophy size fish, Moose Creek is not used as much as other tributaries for fishing. There are no developed campgrounds in the Moose Creek area. Most visitors, including small-scale suction dredge miners, camp in undeveloped areas near the creek. Few trails are located in the area. There is one lightly-used secondary trail (Trail 690 - Moose Creek Trail) that runs along the ridge above Moose Creek.

Access to Moose Creek is off of Deception Saddle Road 255. This road is an arterial route that extends from Road 250 at Kelly Forks to Road 250 near Deception Creek. Road 255 is an alternative route to the Black Canyon segment of Road 250 for through traffic. Most visitors use this road to access the Kelly Forks Campground and other dispersed recreation sites. It also serves as a haul route for timber management in the area.

Dispersed recreation activities occur year-round, but the majority of activity occurs during snow-free months from mid-May to early November. Roads and trails are not maintained during winter. Little use occurs from mid-November to mid-May although a few hardy snowmobilers travel Roads 247 and 250 to sightsee.

3.3.8 Visual Resources

Section 3.2.8 describes how the Forest Service assigns and uses Visual Quality Objectives (VQOs) to manage visual resources, and also describes how most of the North Fork Clearwater Basin retains a high scenic integrity (with a VQO of *Retention*).

Moose Creek sits in a river canyon and ridge system surrounded by forests. Views in the foreground and tributaries consist of water forms, rock forms, large boulders, deep pools, and gravel bars. Vegetation consists of large stands of conifers interspersed with deciduous vegetation. The creek provides the only distinctive attraction, other areas are scenic but common and do not provide a unique attraction to the area. The Moose Creek area has not had a specific VQO assigned to it. Adjacent areas are managed for *Retention* in the foreground, *Partial Retention* in the middleground, and *Modification* in the background.

There are no developed campgrounds in the Moose Creek study area; visitors camp in various dispersed areas, where no amenities are provided. In general, while scenic, the area does not have any unique characteristics and is similar to other drainage systems found throughout the Clearwater National Forest.

For the Moose Creek area, there are no visual travel corridors adjacent to Moose Creek, but the 255 road from Kelly Forks to the mouth of Moose Creek and the Little Moose Ridge Trail are nearby, and each has a VQO of *Retention*.

3.3.9 Noise

See Section 3.2.9 for a description of how noise levels are measured and evaluated. Forest Roads 255 and 5440 parallel portions of Moose Creek and tributaries.

Natural noises would include flowing water, insects, birds, and other animals. There would also be noises from human activities, such as vehicles on the roads, recreational vehicle engines and power generators on dispersed campsites, and aircraft. Background noise levels have not been measured in the Moose Creek study area. However, average noise levels could be expected to vary from 25 to 75 dB (Figure 3-4).

3.3.10 Socioeconomics

Clearwater National Forest is influenced by conditions occurring at National and Regional levels. However, the area most affected by activities in the Forest, and that would most affect activities in the Forest, is local in nature. Visitors to CNF come from across the country, but a large majority are from the Pacific Northwest. Most visitors reside in northern Idaho and northeast Montana, with fewer visitors from increasing distances.

The Moose Creek area is within Clearwater County, Idaho. Clearwater County is the economic area most affected by activities in Moose Creek . In 2000, the population of Clearwater County was 8930 and per capita annual income was $15,463 (U.S. Department of Commerce, 2001).

The actual amount of gold recovered by small-scale suction dredging in Moose Creek is unknown; thus, it is not known what contribution the income from suction dredge mining would make to any individual's income or to the local or regional economy. None of the prospective operators are known to rely on suction dredging as their sole source of income, or even as a major source of income.

3.3.11 Heritage Resources

Much of the historical setting for Moose Creek is similar to Lolo Creek and is repeated here for clarity.

As discussed in detail in Section 3.2.11, heritage resources are any prehistoric or historic district, site, building, structure, or object considered important to a culture, subculture, or community for scientific, traditional, religious, or other purposes. Native American Treaty rights and traditional uses are described in more detail in Section 3.4.

3.3.11.1 Historical Setting

Aboriginal land use of the project region probably dates to at least 10,000 years ago, although this early period is poorly understood for the Clearwater Region (USFS 2002e). Inhabitants are likely to have lived in small groups, using a diversity of canyon and upland floral and faunal resources (including large game animals) as encountered. Tools included short-bladed projectile points, knives, and scraping tools. As the climate gradually warmed, the population increased, and shifts in subsistence practices are represented by small campsites along the rivers and streams of the region. Game such as deer, elk, rabbits, birds, and fish were taken locally, and plant use increased. Tool types increased in variety and included dart points and plant processing tools such as ground cobbles and pestles (USFS 2002e). After about 3,500 years ago, bow and arrow technology was introduced and pithouse villages became more common. Deer, elk, and bison, among other large game, were hunted as locally available. Semi-permanent villages were established in the Clearwater River region. The larger dart points of earlier periods were replaced with small arrow points and major root processing is represented by large mortars and digging sticks (USFS 2002e). After the introduction of the horse to many (though not all) Plateau groups between 300 and 400 years ago, mobility increased and dwellings shifted to more portable structures (USFS 2003f).

At the time of Euroamerican arrival in the region in 1805, the Nez Perce people occupied villages in the Clearwater River region, among other areas (USFS 2002e). Traditional Nez Perce territory in the Clearwater, Snake, and Salmon River basins provided game animals, plants and fish resources. Estimates suggest that the majority of Nez Perce resource use focused on the acquisition of fish, including Chinook, coho, chum and sockeye salmon, and lamprey (USFS 2002e). Non-anadromous fish included dolly varden, lake and cutthroat trout, squawfish, suckers and sturgeon. Plant resources included camas and couse, among many others. Section 3.4 provides a more detailed description of Nez Perce use of plant and animal resources.

Lewis and Clark's Corps of Discovery expedition entered the region along the Lolo Trail in 1805. Between 70 and 130 Nez Perce villages are estimated to have been located in the river basins of central Idaho when Lewis and Clark came through (USFS 2002e). The trail, known as *Khoo-say-na-is-kit* by the Nez Perce, was used by Native Americans to travel to and from buffalo country. In the 1830s, the trail was used by fur traders, and in the 1850s was investigated by John Mullan for its potential as a military trail (USFS 2002e). Today, the Lolo Trail is a National Historic Landmark (USFS 2003f) and the Lewis and Clark Trail is a National Historic Trail.

As Euroamerican settlers moved into the region following initial exploration, settlers and miners began to encroach on the Nez Perce homeland. In 1855, Isaac Stevens, the governor of the newly formed Washington Territory, called the Nez Perce leaders to a council at Walla Walla to create a reservation. An agreement was reached that reserved most of the traditional Nez Perce homeland (7.7 million acres) as their exclusive domain.

In 1860, gold was discovered on the Nez Perce Reservation at a location that would become known as Orofino Creek (Hoggatt 1997). The discovery of gold created a rush to the Nez Perce Reservation. By 1863, the U.S. government was unable to control Euroamerican incursions into Nez Perce lands and attempted to negotiate a second treaty, dramatically reducing the size of the reservation that had been established in 1855 (Hoggatt 1997).

Eventually the U.S. government directed all non-treaty Nez Perce to move onto the reservation. On the way to the reservation, young warriors (independent of the Nez Perce leadership) sought out specific settlers to avenge the deaths of certain Nez Perce people (Hoggatt 1997). The outbreak of violence ignited the Nez Perce War of 1877. The route of the non-treaty Nez Perce as they fled U.S. military forces across the Northwest is memorialized as the Nez Perce (or Nee-Me-Poo) National Historic Trail in 1986 (USFS 2003f). The trail began in Oregon, led eastward over the Lolo Trail, and into Montana (USFS 2003f).

The Flathead people are known to have come into Nez Perce territory from east of the Bitterroot Divide to use salmon fisheries and camas meadows. Although the western extent of Flathead use of the region is not well defined, it may have included the Lochsa River and its tributaries in Idaho (USFS 2002e).

Initial mineral explorations in the region did not locate gold in the North Fork Clearwater River drainage. However, after 1860, when gold was found on Orofino Creek and the Lolo Trail was improved as a route into the region, a gold rush to Moose City, in the present Moose Creek study area, ensued. Mining north of the town of Pierce also extended into some North Fork streams, although those placers did not compare with Orofino Creek (ISHS 1981). The Moose Creek mines were discovered by prospectors in 1862. An influx of population in the late 1860s resulted in the establishment of Moose City, with a saloon, restaurant, hotel, and three general stores (Western Historical Publishing 1903). During the early 1870s the mines began to fail, although limited mining continued in the district and the region for more than 100 years, with upswings at the turn of the 19th century when the Pioneer Mine was established, in the 1920s, and then again in the 1930s.

In the early 1900s, large-scale commercial logging began to gain importance in the Clearwater region (ISHS 1981). North Fork log drives were prominent until Dworshak Reservoir was constructed. New towns such as Headquarters and Elk River grew up in association with logging (CHM 2003). Logging continued throughout the 20th century. USFS operations became prominent in the region after 1906. The Bitterroot Forest Reserve in Idaho and Montana was established in 1897. In 1907, part of the Bitterroot Forest that included the Lolo Trail became the Clearwater and Lolo National Forests (USFS 2002e). The Clearwater National Forest continues to manage the project region today.

3.3.11.2 Identified Heritage Resources

Heritage resource inventories in the Moose Creek study area began in the 1970s and continue into the present. According to SHPO records, previous surveys have identified 22 heritage resource sites in the Moose Creek study area. All are associated with historic Euroamerican use of the watershed. Although there are no heritage resources listed in the National Register of Historic Places (NRHP) in the study area (NRIS 2003), there are resources that are eligible for listing. The USFS has identified the Moose Creek mining area as a Historic District that is eligible for listing in the NRHP. Previously recorded sites include the Independence Mine location (ca. 1920s); the NRHP-eligible Johnson/Pollock Cabin (10CW146) used from about 1880 through the 20th century, the historic mining town of Moose City; a number of cabins and mining features associated with mining during

the 19th and 20th centuries; the USFS Kelly Creek Work Center (ca. 1920s); and the USFS Independence Ridge Lookout (ca. 1930s).

In addition, there were many historic mining claims filed along Independence Creek, Deadwood Creek, and Moose Creek, as well as around Moose City, that have not yet been recorded as heritage resources. Until a formal determination of NRHP eligibility is made, all recorded and unrecorded heritage resource sites are treated as eligible for nomination to the NRHP.

According to the records of the Idaho SHPO, Native American resources have not yet been recorded in the Moose Creek study area. The USFS has initiated contact with the Nez Perce Tribe to identify potential traditional resource concerns in the Moose Creek study area.

3.4 Native American Treaty Rights and Traditional Uses

Tribal governments have an increasing influence on the formulation of public land policy through agency recognition of their legally established rights as well as their unique trust relationship with the U.S. Government. A series of Indian trade and intercourse acts, adopted in 1834, became the cornerstone of Federal Indian policy. The Marshall Trilogy (three Supreme Court decisions made between 1823 and 1831) established that: (a) only the Federal government has the pre-emptive right to procure Indian land; (b) the Federal government has trust responsibilities toward American Indian Tribes; and (c) treaties take precedence over state laws.

Treaty Rights: For the purposes of western expansion, keeping the peace, and adding new states to the union, the U. S. government negotiated treaties with Indian tribal governments and obtained the vast majority of public domain land in the lower 48 States. Approximately 60 tribes negotiated and reserved their treaty rights to off-reservation lands and resources. Off-reservation treaty rights on National Forest System lands may include grazing rights, hunting and fishing rights, gathering rights and interests, water rights, and subsistence rights. In some treaties in the Pacific Northwest the U.S. government is obligated to protect the tribes' right to access usual and accustomed fishing places and open and unclaimed lands, and must ensure that Forest Service actions protect treaty resources and do not prevent tribes or their members from accessing such locations to exercise tribal rights.

Trust Responsibilities: The trust responsibility is the U.S. government's permanent legal obligation to exercise statutory and other legal authorities to protect tribal lands, assets, resources, and treaty rights, as well as a duty to carry out the mandates of Federal law with respect to American Indian and Alaska Native Tribes. For the Forest Service, trust responsibilities are those duties that relate to the reserved rights and privileges of federally-recognized Indian tribes as found in treaties, executive orders, laws, and court decisions that apply to the national forests and grasslands. Forest Service policy (FSM 1563.03) is to: (a) maintain a governmental relationship with federally-recognized tribal governments; (b) implement Forest Service programs and activities honoring Indian treaty rights and fulfill legally mandated trust responsibilities to the extent they are determined applicable to National Forest System lands; (c) administer Forest Service programs and activities to address and be sensitive to traditional Native religious beliefs and practices; and (d) provide research, transfer of technology, and technical assistance to tribal governments.

Nez Perce Tribe: The valleys, prairies, and plateaus of north-central Idaho, northeastern Oregon, and southeastern Washington, encompassing approximately 17 million acres (approximately 27,000 square miles), were home to the Nez Perce people who call themselves Nimi'ipuu, which means the "real people" or "we the people" (Nez Perce Tribe 2002). The Nez Perce aboriginal territory included the Clearwater River Basin, and the South and Middle Forks of the Salmon River Basin,

and its tributaries where the people fished the streams, hunted in the woodlands, and used the plants of the high plateaus in a seasonal subsistence cycle. In early spring, the women traveled to the lower valleys to dig root crops while the men traveled to the Snake and Columbia rivers to intercept the early salmon runs (Nez Perce Tribe 2002). In mid-summer, all the people moved to higher mountain areas setting up temporary camps to gather later root crops, fish the streams, and hunt big game. By late fall, they settled back into their traditional villages along the Snake, Clearwater, and Salmon rivers. Salmon and other fish, game, dried roots, and berries provided winter foods. In addition, hunting parties would travel to the hills and river bottoms where the deer and elk wintered.

Roots gathered for winter storage included camas bulb (kehmmes), bitterroot (thlee-tahn), khouse (qawas), wild carrot (tsa-weetkh), wild potato (keh-keet), and other root crops (Nez Perce Tribe 2002). Fruit collected included serviceberries, gooseberries, hawthorn berries, thorn berries, huckleberries, currants, elderberries, chokecherries, blackberries, raspberries, and wild strawberries. Pine nuts, sunflower seeds, and black moss were also collected. Large game animals that were hunted include deer, elk, moose, bear (black, brown, and grizzly), mountain sheep and goats (Nez Perce Tribe 2002). After the introduction of the horse, the men traveled to the Montana Plains to hunt bison and antelope with the Flathead (Sa-likh) people. Even after bison was introduced into the Nez Perce diet, deer and elk meat were still important foods for the winter storage. Small game was hunted when needed, including rabbit, squirrel, badgers, and marmots. Birds, such as ducks, geese, ruffed grouse, and sage hens were also hunted (Nez Perce Tribe 2002).

The Nimi'ipuu lived in bands making up the Upper Clearwater River Nimi'ipuu and the Lower Nimi'ipu of the Wallowa Valley. The bands included small groups of people living in villages along streams and rivers, together making up a larger, politically unified composite band. The bands were generally identified by the name of the stream they lived near.

In 1855, Isaac Stevens, the governor of the newly formed Washington Territory, called the Nez Perce leaders to a council at Walla Walla to create a reservation. An agreement was reached that reserved most of the traditional Nez Perce homeland (7.7 million acres) as their exclusive domain. Article 3 of this treaty states:

> *"The exclusive right of taking fish in all the streams where running through or bordering said reservation is further secured to said Indians; as also the right of taking fish at all usual and accustomed places in common with citizens of the Territory; and of erecting temporary buildings for curing, together with the privilege of hunting, gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed land."*

After the discovery of gold on the reservation, a new treaty was signed in 1863 that reduced the size of the original reservation to 780,000 acres. Not all of the Nez Perce bands were in agreement with the new treaty, and a division arose between the "treaty" and "non-treaty" groups.

Nez Perce leaders who opposed the treaty (non-treaty Nez Perce) included Big Thunder, Hah-tal-ee-kin, Eagle from the Light, Old Looking Glass, Old Joseph, Too-hool-hool-zote, Speaking Eagle, and White Bird (Hoggatt 1997). Less than one third of the Nez Perce leaders supported the treaty (treaty Nez Perce). One of the supporters was Chief Lawyer, the Head-Chief, who felt that resistance was futile and reconciliation with the government was in the best interest of the Nez Perce people. A number of the leaders who opposed the treaty left the Treaty Council after abolishing the Nez Perce Federation and the position of Head-Chief of the Nez Perce People (Hoggatt 1997).

Four years later, the U.S. government launched a campaign to remove Chief Joseph's Wallowa Band of non-treaty Nez Perce from the Wallowa Plateau to the new, smaller reservation. At the same time all other non-treaty Nez Perce were also ordered to move onto the reservation (Hoggatt 1997). On the way to the reservation, young warriors (independent of the Nez Perce leadership) sought out specific settlers to avenge the deaths of certain Nez Perce people, touching off the Nez Perce War of 1877 (Hoggatt 1997).

After a number of skirmishes with the U.S. Army, about 750 Nez Perce men, women, and children attempted to escape to Canada on what is now known as the Nez Perce (Nee-Me-Poo) National Historic Trail. They traveled 1,170 miles from the Wallowa Valley in eastern Oregon to the plains of north-central Montana, where Chief Joseph surrendered 40 miles from the Canadian boundary, near Bear Paw, Montana. Chief White Bird and about 150 to 200 Nez Perce escaped through the battle lines and fled into Canada.

In 1893, the Nez Perce Tribe ceded and sold to the U.S. government all un-allotted lands on the reservation with exception of certain lands held for the benefit of the entire Tribe. The current reservation consists of 750,000 acres, of which the Tribe owns approximately 90,000 acres. However, the Nez Perce Tribe still retains the treaty rights reserved in the 1855 Treaty. These rights apply to most of the Clearwater National Forest, including all of the Lolo Creek and Moose Creek study areas.

The Nez Perce Tribe has identified salmon as an integral part of tribal religion, culture, and physical sustenance, and has indicated that the annual return of the salmon allows the transfer of traditional values from generation to generation (CRITFC 2002). The Yoosa Creek tributary of upper Lolo Creek, outside the present study area, is the location of a satellite facility site for the Nez Perce tribal hatchery program (see Figure 2-1). The tribe has further indicated that Lolo Creek is an important stream in restoration efforts for chinook salmon in the Clearwater River Subbasin (Mancuso 1996).

It is part of the vision of the Nez Perce Tribe to "recover and restore all populations, all species, of anadromous and resident fish within Nez Perce Territory" (Nez Perce Tribe 2003). Its fisheries management goals are to provide technical, scientific and policy support to for treaty rights protection; to provide anadromous and resident fish recovery and restoration actions; to expand harvest opportunities for tribal members and the regional community; to monitor and evaluate production, habitat harvest, and applied science activities; to restore and recover habitat for healthy watershed environment; and to ensure harvest and conservation actions comply with tribal laws and policies (Nez Perce Tribe 2003).

4.0 Environmental Consequences

This chapter describes the potential environmental consequences of the proposed action and alternatives. The descriptions of potential impacts are organized by resource area; where potential impacts are different in one creek or another, this is covered under the resource at issue. The chapter is organized as follows:

- 4.1 Hydrology and Stream Discharge
- 4.2 Stream Geomorphology
- 4.3 Water Quality
- 4.4 Fisheries
- 4.5 Instream Habitat
- 4.6 Aquatic Invertebrates
- 4.7 Threatened and Endangered Fish
- 4.8 Wildlife
- 4.9 Riparian Vegetation
- 4.10 Recreation
- 4.11 Visual Resources
- 4.12 Noise
- 4.13 Socioeconomics
- 4.14 Heritage Resources
- 4.15 Nez Perce Treaty Rights and Traditional Uses
- 4.16 Cumulative Effects
- 4.17 Irreversible and Irretrievable Commitment of Resources

The discussion of potential impacts focuses on direct impacts, which are those caused by the action and that occur at the same time and place (40 CFR 1508.8(a)). Both the direct and indirect impacts are discussed by resource in Sections 4.1 to 4.15. Section 4.16 addresses cumulative impacts, which result from the incremental impact of the action when added to the impacts of other past, present, and reasonably foreseeable actions (40 CFR 1508.7).

4.1 Potential Effects on Hydrology and Stream Discharge

4.1.1 Alternative 1: No Action

Hydrologic conditions, such as water yield, peak runoff, and annual sediment yield, within any watershed are a function of land use activities and management. Land use activities and management goals are specified within the guidelines of the Forest Plan (USFS 1987) and would not change as a result of any alternative. Under this alternative, not approving small-scale suction dredging plans of operations would not affect stream flow or annual sediment yield within the Lolo Creek or Moose Creek watersheds. There would continue to be an elevated sediment yield from the Lolo #5 mining claim on Lolo Creek and from the unimproved road crossing on Independence Creek.

4.1.2 Alternative 2: Proposed Action

Watershed conditions and management would remain the same under the Proposed Action alternative as under the No Action Alternative. Suction dredging would not introduce sediment to or increase sediment in the Lolo Creek or Moose Creek study areas but rather would relocate it by removing it from the substrate, passing it through the suction dredge, and replacing it into the creek,

where it would settle out within a short distance. Thus, allowing approval of small-scale suction dredging plans of operations with the specified terms and conditions would not affect the amount of stream flow, water yield, or annual sediment yield produced in either the Lolo Creek or Moose Creek watersheds.

4.1.3 Alternative 3: Suction Dredging and Stream Improvement Projects

Potential impacts from suction dredging under this alternative would be the same as under Alternative 2. During construction, there would be a temporary increase in sediment yield from the Lolo#5 project on Lolo Creek. These would be reduced by the use of standard construction erosion control and runoff practices. Over the longer term, there would be a permanent reduction in sediment yield from this reach of Lolo Creek.

Similarly, in Independence Creek construction of a properly designed ford or crossing structure would increase sediment during construction. After completion of construction, the newly improved crossing would slightly reduce sediment yield in Independence Creek from current levels.

4.2 Potential Effects on Stream Geomorphology

4.2.1 Alternative 1: No Action

Channel geomorphologic conditions would be expected to remain essentially unchanged under the No Action Alternative. Minor impacts to channel banks, and channel conditions that result from other small-scale uses such as fishing, camping, wading, and swimming would still occur.

Bank stabilization and reclamation proposed for the abandoned Lolo #5 mining claim on Lolo Creek would not be conducted under the No Action Alternative. Unstable banks in the area would remain the same, and would continue to provide an exposed source of sediments to the creek. The channel in the area of the claim would remain channelized, which can result in increased channel scour both upstream and downstream of the site. These impacts could propagate over time, affecting additional lengths of the channel each year.

Installation of a drainage device or ford at the Forest Road 5440 crossing on Independence Creek would not be conducted under the No Action Alternative. The present road crossing is a ford that serves as a source of sediment (from localized scouring of the channel) to downstream Independence Creek and Moose Creek. Improperly designed or unstable road crossings can locally affect stream channel morphology. These effects cause erosion of the channel bottom or channel banks. In time, changes to channel morphology could be propagated both up and downstream until the stream comes back into equilibrium.

4.2.2 Alternative 2: Proposed Action

In-stream structures, such as large boulders and large woody debris, provide local stability to a channel. These structures control stream gradient, flow direction, or produce localized pools or cover for fish. Removal of large boulders or other large structures by suction dredge operators could locally affect the energy and direction of stream flow and cause the channel to change over the long term by eroding the channel bottom or channel banks. In time, these changes could be propagated both up and downstream until the stream comes back into equilibrium. The terms and conditions to which prospective operators must agree in order to be approved under the proposed action stipulate that the creek cannot be dammed (Chapter 2, condition 18), large woody debris and large boulders cannot be moved (Chapter 2, conditions 13 and 14), and tailings cannot be piled on banks or in a

manner that stream flow is directed into a bank (Chapter 2, condition 12). Long-term impacts to channel morphology would not be expected with the terms listed above.

Suction dredging typically involves dredging one or several cone-shaped holes in the streambed, with the excavated material then placed in a pile or placed into a previously dredged hole. A single hole typically involves removal of one or a few cubic yards of material. Small-scale suction dredging would cause impacts to localized areas of the channel bottom by moving substrate materials, and some redirection of stream flow could result from moving and piling bottom materials in the channel. While dredging activities would cause a temporary disruption of channel substrate materials, the terms and conditions (Chapter 2, condition 23) state that all displaced substrate materials must be replaced after dredging activities are completed. In addition, the Forest Service will monitor all active sites at least five times during the mining season, and again after reclamation is complete, to monitor potential changes in morphology. Based on these stipulations, impacts would be temporary and not result in long-term alteration of the channel morphology or stream equilibrium.

The bank stabilization and reclamation proposed for the abandoned Lolo #5 mining claim on Lolo Creek and the installation of a drainage device or ford at the Forest Road 5440 crossing on Independence Creek would not be conducted under the Proposed Action alternative. Long-term impacts of not completing these projects would be the same as those discussed for the No Action Alternative.

4.2.3 Alternative 3: Suction Dredging and Stream Improvement Projects

The bank stabilization and reclamation proposed for the abandoned Lolo #5 mining claim on Lolo Creek and the installation of a drainage device or ford at the Forest Road 5440 crossing on Independence Creek would be conducted under this alternative. Potential impacts on stream geomorphology from suction dredging would be the same as under Alternative 2.

The bank stabilization activities on Lolo Creek would directly reduce bank erosion, which alters the stream channel morphology and sedimentation of the creek. Restoration of the stream channel to match expected stream gradients, natural pool-riffle ratios and channel sinuosity would mitigate impacts associated with increased stream flow velocities and channel erosion that result from the current channelized condition.

Installation of a properly designed and stable ford or other crossing structure at the Forest Road 5440 crossing on Independence Creek should not significantly affect stream geomorphology.

4.3 Potential Effects on Water Quality

4.3.1 Alternative 1: No Action

There would be no potential impacts from accidental spills or discharge of wastes or chemicals to the stream from suction dredging activities under this alternative. Accidental spills of chemicals or wastes near or in streams could still potentially occur from camping and other activities that would occur even without suction dredging.

Fine sediment and turbidity levels in Lolo, Deadwood, Independence, and Moose Creeks would remain low under the No Action Alternative. Low levels of sediment and turbidity would continue to be caused by nearby roads and camping activities near the streams.

Under the No Action Alternative, historic dredge tailings and overburden materials in the Collette Mine area at Lolo #5 would continue to provide localized delivery of sediments to Lolo Creek. Erosion of unstable stream banks in this area would continue to be a source of sediment to the creek.

The existing Forest Road 5440 crossing over Independence Creek would continue to be source of sediment to downstream Independence Creek and Moose Creek. Localized scouring of the channel and the resulting increases in sediment and turbidity would remain unchanged under the No Action Alternative.

4.3.2 Alternative 2: Proposed Action

Potential impacts to water quality could result from accidental spills of chemicals or wastes near or in the streams by suction dredge operators. A number of the terms and conditions for the proposed action are designed specifically to prevent or minimize spills, including conditions intended to keep refuse and human wastes away from water (Chapter 2, condition 29), to ensure fuels are stored and used safely (Chapter 2, conditions 26 and 27), to prohibit the use of hazardous or refined substances to recover gold (Chapter 2, condition 28), and to avoid dispersal of any mercury encountered in old dredged material Chapter 2, (condition 28). These conditions will prevent any significant impacts from spills, and Forest Service inspections under this alternative would ensure that operators are following the stipulated conditions.

Suction dredging that would be approved under this alternative occurs in the confines of the stream channel (Chapter 2, condition 1) and does not result in the discharge of any new sediment to the creeks. The suction dredge pulls stream sediment, gravel and small rocks, and other materials (collectively, the "overburden") from the stream bottom, along with any gold. All this material is routed through a sluice box, which channels the water and other material over a series of riffles that serve to create pockets of slow water immediately behind each riffle -- the heavier material, including any gold, settles behind the riffles and the rest goes directly back into the stream. Dredging can entrain and discharge fine sediments from the streambed material and increase turbidity[9] in the stream immediately downstream of the discharge point. Idaho DEQ requires that background turbidity levels not be increased by more than 50 NTU[10] instantaneously or 25 NTU for more than 10 days (IDEQ, 2000). The degree that turbidity is increased by dredging is expected to be highly variable and dependent on the amount of very fine sediments (i.e., silts and clays) that occur in the bed material and the velocity of the stream flow. As discussed in Chapter 3, the size and amount of sediment that can be carried by a stream is related to the stream flow velocity.

As noted in Chapter 3, Lolo Creek contains relatively little very fine sediments even though cobble embeddedness is relatively high. Figure 3-1 shows that a very small fraction (less than one percent) of sampled bed material in Lolo Creek consists of fine materials (<0.25 mm). Stream flow velocities during the permissible operating season in July and August also are low, with values of 1.29 and 0.93 feet per second, respectively (Table3-5). At these flow levels, suspended particles would settle out very quickly. It is very unlikely that increases in turbidity above the 50 NTU limit would occur as a result of suction dredge operations in Lolo Creek. Any increases in turbidity at all would be for a very short duration while the dredge is operating, and any fine sediment that may be released

[9] Turbidity results from an increase of suspended fine sediment that reduces water clarity.

[10] As noted in Chapter 3, Nephelometric Turbidity Units are measures of turbidity that result from a photogrammetric method of measuring light transmission through water. As turbidity increases, more light is scattered by suspended particles in the water and less light is transmitted through the water.

would drop out within a short distance downstream, particularly in areas where stream velocities are greatly slowed, such as a pool. These extremely localized and temporary increases would be minor compared to the background total sediment loads of 1,541 and 500 pounds per day in July and August, respectively (Table3-4).

Figures 3-6 and 3-7 in Chapter 3 show particle size distributions for Independence and Moose Creeks. These data suggest that a somewhat larger fraction of fine materials may exist in these creek substrates than is found in Lolo Creek although data are not available for very small size fractions that would include silt and clay material. Size fraction data are not available for Deadwood Creek, but particle size distribution of the Deadwood Creek substrate would be expected to be similar to Moose and Independence Creeks because of similar historic watershed activities and impacts.

These data suggest that it is more likely that detectable increases in turbidity would occur during suction dredge operations in these creeks. However, low observed background turbidity levels (Table 3-13, 3-14, and 3-15 for Deadwood, Independence, and Moose Creek, respectively) suggest that levels of very fine sediment that could potentially increase turbidity are low. Low stream velocities in July and August, which are also observed in these creeks (Table 3-16), should prevent long-distance transport of even fine sediment disturbed and suspended by suction dredge operations, since suspended particles would settle out within a short distance.

To ensure that any increase in turbidity is short-lived and localized, condition 15 (see Chapter 2) requires that operators visually monitor the stream for 300 feet downstream for the first half hour of operation. If they observe noticeable turbidity, they are required to cease or reduce operations until there is no increase visible 300 feet downstream.

Increases in turbidity, potentially above the 50 NTU standard, would be expected only if dredging activities extend into channel banks, since banks would be a ready source of fine sands, silts, and clays. Operators must agree not to undercut, destabilize, or otherwise disturb stream banks (condition 10), and Forest Service inspections will ensure compliance and minimize the potential for bank disturbance and consequent increases in turbidity.

Increases in turbidity above the 50 NTU standard could also occur from the combined effects of multiple operators operating within close proximity within a stream. However, under condition 21, operators will be required to cease operations if visible turbidity is identified regardless of the operator spacing.

Under this alternative, the Lolo #5 areas and the Forest Road 5440 crossing would continue to contribute sediment and increase turbidity in downstream areas.

4.3.3 Alternative 3: Suction Dredging and Stream Improvement Projects

Potential impacts to water quality that could result from camping, vehicular traffic, and other non-mining activities would be the same as under Alternative 1, and potential impacts from suction dredging activities under this alternative would be the same as those under Alternative 2.

Regrading and stabilization of the tailing materials and disturbed areas at the Lolo #5 mining claim would be conducted under this Alternative, and this would stabilize exposed stream banks and reduce or eliminate further sedimentation and increases in turbidity from this area. Exposed sediment sources from piles of dredge tailings and overburden materials would be regraded and reclaimed to prevent future erosion and delivery of sediments to Lolo Creek. There would be localized increases in turbidity during construction but the use of State Best Management Practices

(IDL, 1992) would mitigate these increases substantially. The net effect of this alternative would reduce sediment loadings into Lolo Creek and improve water quality over the longer term.

Similarly, installation of a drainage device or ford at the Forest Road 5440 crossing of Independence Creek would stabilize the channel and reduce the sediment and turbidity that result from and around the current ford. Again, there would be increases during construction but reductions over the longer term.

4.4 Potential Effects on Fisheries

4.4.1 Alternative 1: No Action

Ongoing recreational fishing would continue under this alternative, but this should not affect the long-term viability of any fish population or species. There could be spills from camping or other activities, as described in Section 4.3.1.

The area disturbed by past mining in the Lolo #5 area would not be restored under this alternative. The stream would remain channelized, banks would remain unstable, and there would continue to be increased sediment loadings. All of these elements result in reduced habitat quality, which would affect the use of the area by fish.

Installation of a drainage device or ford at the Forest Road 5440 crossing on Independence Creek also would not be conducted under this alternative. The present road crossing is a ford that serves as a partial fish barrier during low flows and also a source of sediment (from localized scouring of the channel) to downstream Independence Creek and Moose Creek.

4.4.2 Alternative 2: Proposed Action

The effects of camping and other activities, and of not implementing the stream improvement projects, would be the same as under Alternative 1.

As noted in chapter 1, there could be up to 18 proposed plans for operation in Lolo Creek. If 18 suction dredges operated the entire season, then the estimated total disturbance would be 27,500 square feet. The total fish bearing stream area of Lolo Creek within Forest Service Lands is 3,098,200 square feet, and the total fish bearing stream area within the study area is 1,822,415 square feet (Clearwater BioStudies, Inc. 1999a). The disturbance of 27,500 square feet represents 0.9 per cent of the total fish bearing stream area of Lolo Creek within Forest Service Lands, and 1.5 per cent of Lolo Creek area within the study area (USFS 2006a).[11]

When a similar approach is applied to the Moose Creek study area, if 38 suction dredges operated the entire season, then the estimated total disturbance would be 50,616 square feet. The total fish bearing stream area of Moose Creek, Independence Creek and Deadwood Creek is 1,504,163 square feet. The disturbance of 50,616 square feet represents 3.4 per cent of the total fish bearing stream area of within the study area (USFS 2006b).[12]

[11] This is the maximum area that could be disturbed, but the area that is reasonably likely to be disturbed in any given year would be much smaller. In 2001, for example, there were only eight section dredge operations in Lolo Creek. Of these, only two dredged for close to a full season (46 days), while the other six were active for only one or two weeks.

[12] Again, this is the maximum area, and again the actual area disturbed would be much less. In 2001, the Forest Service received 11 proposed plans of operations for Moose Creek, Independence Creek, and Deadwood Creek. Of these, only three dredged for the full season, while the rest dredged from a weekend or two up to several weeks.

The window for dredging operations would occur from July 1 to August 15 (condition 1). This would minimize impacts to most larval and juvenile fish, and occurs after steelhead trout and bull trout emerge from the substrate.

Potential impacts from mortality and injury. Salmonid alevins are the larval stage between the egg and the free-swimming fry or juvenile. They develop from eggs deposited in gravels of the redd. Dredge-related mortality of eggs, larvae, and alevins can occur in three ways. First, they could be crushed underfoot when operators cross streams while moving in gear and mining equipment. Redds are typically located in shallow, flat-gradient stream areas that afford good footing for those crossing a stream. Secondly, debris tailings and fine sediment could be deposited on a redd, trapping or suffocating alevins from excess fine sediment deposition or oxygen depletion.

Thirdly, eggs, larvae, and alevins could be entrained through the intake pipe. Griffith and Andrews (1981) found high mortality of entrained eggs of cutthroat trout before eye-up but mortality was less as eggs matured. Cutthroat trout sac fry suffered more than 80 percent mortality from suction dredging entrainment compared to a 9 percent natural mortality rate. They speculated that entrainment would likely kill larvae of other fish species and that eggs, larvae, and fry surviving entrainment could suffer from subsequent predation and stress. Juvenile and adult salmonids would likely avoid or survive passage through a suction dredge (Harvey and Lisle 1998). Post-emergent salmonids would also be vulnerable until they are large enough to avoid entrainment. Juvenile and adult salmonids would normally be able to avoid entrainment (Harvey *et al.* 1995).

Steelhead trout and chinook salmon would be more likely to be affected in Lolo Creek due to the potential for more spawning and egg deposition in areas that could be dredged (see Table 3-6 in Chapter 3). However, the likelihood of impacts in Lolo Creek is considered to be very low due to the small area of disturbance that may overlap with spawning habitat and the fact that suction dredging operations would not begin until most steelhead have emerged from the redds, and would end before most chinook spawn (August 15 through September 15, as specified in Chapter 2, condition 1). Suction dredge operations are only allowed to be located in areas of large substrate not preferred for spawning steelhead trout and bull trout (Chapter 2, condition 3). In addition, operators must meet with a Forest Service fisheries biologist who will inspect the site area for redds prior to commencement of dredging and not allow dredging in areas where redds are found (Chapter 2, condition 3). Further, to avoid fish entrainment, operators are required to use a 3/32 mesh screen for their pump intake hoses (Chapter 2, condition 5). All of these conditions, combined with the fact that the Forest Service will inspect the operations at least five times during the suction dredge season to ensure compliance, will reduce the potential for any significant impacts on fish.

Potential impacts from disturbance and dislocation. Suction dredging could disturb salmon holding in deep pools during summer, particularly if numerous dredges are operating or water temperatures are elevated (Somer and Hassler 1992).

Dredge piles that span the stream channel are not permitted (Chapter 2, condition 18), although some operators may create temporary partial barriers in order to increase flotation of their dredge in shallow areas of the creeks. Temporary dredge piles that span a substantial portion of the stream width could affect the normal feeding and escapement behavior for juvenile salmonids and other small fishes (Harvey and Lisle 1998). This could cause the affected fish to undergo stress and reduced vigor, or fall prey to predators. These temporary dredge piles would be broken down by the end of the operating season, (Chapter 2, condition 23) and any residual change in the bottom would not persist through the normal peak flow events. When large amounts of substrate are deposited over cobble habitats, riffle sculpin (*Cottus gulosus*) could be displaced (Harvey 1986). Since cobble

substrates are usually not limited in stream reaches of Lolo and Moose creeks, riffle sculpin could quickly disperse to new suitable locations.

Aquatic invertebrates in the substrate are dislodged or otherwise disrupted by dredging operations (see Section 4.6.2). Displacement of these invertebrates creates a short-term attraction for fish feed on them near and immediately downstream of the suction dredge. In the longer-term, over the course of the seasonal operations, suction dredging will deplete some invertebrates that are used as a food source by a variety of fish species and life stages. This would occur in the immediate vicinity of the dredged areas and local fish would be forced to relocate to find food. Fish relocating to new feeding areas may experience increased stress due to predation, exposure to sub optimal habitat conditions, or increased competition with other fish.

Potential impacts from changes in water temperature. Elevated water temperature affects fish metabolism, development, and activity. It lowers the amount of oxygen available to fishes and can induce stress, disease, and mortality. Juvenile and resident salmonids are at risk when temperature exceeds 23-25 degrees Celsius (Spence *et al.* 1996).

The Proposed Action would not affect stream temperature except possibly in the actual site where suction dredging is occurring. Shade trees would not be cut and the width-to depth ratio of dredged channels would not be sufficiently increased to cause solar radiation to increase stream temperature. Pool temperature could be slightly reduced in excavated pools if cooler groundwater is intercepted or deepened pools cause stream flows to stratify. This effect would have little influence on stream temperature beyond the immediate area of suction dredging operations. Even this would be temporary since pools have to be filled by the end of the mining season (Chapter 2, condition 23) — in practice, individual pools are only short-lived since operators fill older pools as they move into new areas during the season. However, the influences of suction dredging in streams with elevated water temperatures could produce synergistic effects (USFS 2001c).

Potential impacts from changes in sediments and turbidity. Fine sediment and turbidity could increase temporarily immediately downstream of active dredges, as described in Sections 4.1.2 and 4.3.2. In those areas where small amounts of fine sediment are being worked and stream flows are high, only small increases in turbidity would be detectable and the effects would be small and short duration. If large amounts of fine sediments are encountered and stream flows are low or moderate, detectable increases in turbidity could occur at the site and could extend a hundred feet or more downstream.

Royer *et al.* (1999) evaluated effects from both 8-inch and 10-inch commercial suction dredge operations. They found that although turbidity and total filterable solids increased downstream of the dredge, the values returned to upstream levels within 80-160 m downstream of the dredge. Turbidity values for the 8-inch dredge were approximately 25 NTUs in the immediate area of suction dredging operations, but fell to less than 5 NTUs within 40 m downstream. Further, the effect of the turbidity plume was limited to approximately seven percent of the river width. It should be noted that the maximum size nozzle for suction dredges that could be approved under the proposed action would be five inches, so the effects of the smaller dredge would be much less than those reported for larger dredges.

Research has found the feeding ability and health of sculpin and salmonids are not significantly impaired by the increased turbidity of suction dredging (Hassler *et al.* 1986). While significant increases in turbidity can stress juvenile salmonids, especially through gill irritation, it would not likely cause mortality (Bash *et al.* 2001). In areas of concentrated suction dredging, the amount of

fine sediment deposition would be cumulative. Mobilized fine sediment would settle downstream within slow water velocity areas such as pools. It is unlikely enough fine sediment would be deposited to measurably reduce pool size. However, large increases in deposited fine sediment could reduce overall habitat quality for salmonids by filling in of interstitial spaces used by juveniles and by reducing the distribution, diversity, and abundance of benthic invertebrates used as prey items (Hassler *et al.* 1986). Fine sediment deposited during the operating season would likely be routed through the stream system during the normal peak flow event.

The substrate sizes in Lolo Creek and Moose Creek are dominated by cobbles and boulders (Tables 3-7 and 3-18 in Chapter 3) and large quantities of fines are not expected. In addition, suction dredging often targets bedrock cracks below the gravel/cobble layer, where even fewer fines are located.

Potential impacts from chemical contamination. As noted in Section 4.3.2, fuel, oil, and grease could be spilled into the creeks and affect aquatic resources. However, these products would be stored in areas and used in a way that minimizes the opportunity for accidental spillage into the stream. Refilling instream equipment is limited to one gallon at a time in the presence of absorbent material. As noted in Section 4.3.2, several conditions under which the Proposed Action would take place should prevent any such impacts.

4.4.3 Alternative 3: Suction Dredging and Stream Improvement Projects

The potential impacts from camping and other non-dredging activities would be the same as under Alternative 1.

Potential impacts from mortality and injury. Fish mortality and injury from suction dredging under this alternative would be the same as under Alternative 2. In addition, the Lolo #5 restoration project in Lolo Creek could crush any eggs, larvae, and alevins in the project area or trap or suffocate alevins from sediment deposition. A Forest Service biologist will inspect the project area and immediately downstream for redds prior to construction, and the Forest Service will consult with NMFS and the USFWS to develop appropriate mitigation if there are active redds. Improvement of the Independence Creek road crossing should not kill or injure fish.

Potential impacts from disturbance and dislocation. Potential impacts of suction dredging by disturbing or dislocating fish under this alternative would be the same as under alternative 2. The Lolo #5 restoration project would cause juvenile and adult fish in the project area to move upstream or downstream at least until construction was complete. Dislocated fish could experience increased stress and reduced vigor, or they could fall prey to predators. The restoration project also could disturb fish for a short distance downstream. Following project completion, fish would be expected to repopulate the areas, which would have significantly improved habitat. The Forest Service will review appropriate mitigation measures and consult with NMFS and the USFWS prior to implementation of the project.

Similarly, construction of the Independence Creek crossing improvement could disturb fish immediately downstream of the project, but effects, mitigation, and construction would be similar to those described above.

Potential impacts from changes in water temperature. Potential impacts of suction dredging on water temperature under this alternative would be the same as under alternative 2. Neither of the restoration projects should have any significant impact on water temperature. The Lolo #5

restoration project could lead to long-term improvements by improving bank stability and providing more suitable ground for vegetation.

Potential impacts from changes in sediments and turbidity. Potential impacts on fish from changes in sediments and turbidity caused by suction dredging would be the same as under alternative 2. As noted previously, the Lolo #5 restoration project and the Independence Creek crossing improvement would temporarily increase sediment load and turbidity in Lolo Creek, and this could stress juvenile salmonids. The application of construction best management practices (IDL, 1992) should reduce the potential impacts. By stabilizing banks and reducing sediment loads, the long-term reduction in sediment resulting from the project should improve habitat quality.

Potential impacts from chemical contamination. Potential impacts on fish from chemical contamination caused by suction dredging would be the same as under alternative 2. Construction equipment used for the stream improvement projects will use fuel, oil, and grease. These could leak or be spilled into the water and affect aquatic resources. Best management practices (IDL, 1992) that are standard for Forest Service construction projects would substantially reduce the possibility that leaks or spills would occur. Improperly managed sanitary wastes from on-site workers also could contaminate streams. Each of the projects would be serviced by portable toilet facilities while workers are on-site, which will eliminate these potential impacts.

4.5 Potential Effects on Instream Habitat

4.5.1 Alternative 1: No Action

There would be no significant impacts from small-scale suction dredging under this Alternative. The only impacts to the streams would come from recreational use, which would be miniscule.

4.5.2 Alternative 2: Proposed Action

Impacts on substrate. The proposed action does not limit the amount of substrate material that could be dredged in a particular claim or river segment, provided individual operators are at least 100 feet apart. Rocks too large to pass through the dredge nozzle (generally greater than 5 inches) would typically be hand-piled along the dredge hole. Dredge tailings would pile at the end of the sluice. Because of the potential for the hand-placed rock and tailing piles to deflect stream flows and cause localized scour and deposition, the operators would replace these materials in the dredge holes before the end of the operating season (Chapter 2, condition 23). Operators would not be allowed to move large, stable boulders over 12 inches in diameter (Chapter 2, condition 14). In addition, any remaining dredge tailings would be blended into the substrate or transported directly downstream of the dredged area during normal high flow events, except in drought years. Fine sediment would be redistributed and deposited in small areas downstream. In general, there would be little impact on the substrate except during the time an area is being actively dredged.

Potential impacts on large stable woody debris. Dredging of sediments could destabilize large instream wood, potentially reducing its stability and causing it to move from its natural location. Destabilizing instream wood could reduce pool frequency and quality and streambank stability. However, the proposed action does not allow instream wood (generally larger than six inches in diameter and three feet in length) to be removed or otherwise disturbed (Chapter 2, conditions 13 and 14), so there should be no effects on woody debris.

Some operators may request authorization to cut streamside shrubs or trees that are a hazard to their operations. If approved, this could reduce stream shade. Felled trees recruited to stream systems would have less ability to form quality pool habitat than intact trees because they lack their stabilizing root wad. This has never been a problem in the past, and Forest Service rules concerning tree cutting should continue to prove sufficient to prevent impacts.

Potential impacts on stream channel conditions. Small suction dredging operations could increase pool frequency where dredging excavates pools and could decrease pool frequency where pools are filled by deposited tailings. An increase in pool frequency could temporarily improve stream channel diversity, a condition beneficial to many fishes and aquatic organisms. However, if excavated pools dry up during late summer, fish and aquatic organisms using them could become stranded and lose vigor or die from intolerable environmental conditions or succumb to predation. The proposed action (Chapter 2, condition 23) calls for backfilling all excavated pools by the end of the mining season on August 15, so this should not become a problem.

Suction dredging could alter pool dimensions and quality through excavation, dredge pile deposition, or changes in channel morphology. Excavating pools could substantially increase their depth and increase cool groundwater inflow. This could reduce pool temperature (Harvey and Lisle 1998). If pools were excavated to a depth greater than three feet, salmonid pool habitat could be improved. In addition, if excavated pools reduce pool temperatures, they could provide important coldwater habitats for salmonids living in streams with elevated temperatures. As noted above, operators must fill all deepened pools by the end of each mining season (Chapter 2, condition 23), so any benefit would be temporary.

Dredge operators may not dam streams (Chapter 2, condition 18), but some operators may build temporary rock barriers partially across the channel to facilitate flotation of dredges. These small barriers would usually be needed for a few hours to a few days. If properly constructed, they generally would not block adult fish passage but could inhibit normal juvenile salmonid feeding behavior and escapement from predators while in place. Operators would have to break down all dredge piles by the end of the operating season (Chapter 2, condition 23). Overall, any impacts from suction dredging would be very localized and minor.

4.5.3 Alternative 3: Suction Dredging and Stream Improvement Projects

Potential impacts on substrate. The potential impacts of suction dredging on stream substrates under this alternative would be the same as under alternative 2. The restoration of Lolo #5 may require restructuring of what is now the substrate in that reach of Lolo Creek. One goal of the restoration project will be to create a stream channel with a substrate that more nearly matches natural conditions. The project also should improve the downstream substrate by reducing bank erosion that serves as a source of fine material. Similarly, the Independence Creek crossing improvement would reduce sediment erosion and improve the downstream substrate.

Potential impacts on woody debris. The potential impacts of suction dredging on woody debris under this alternative would be the same as under alternative 2. The Lolo #5 restoration project may require the removal of current woody debris, but this would be matched by the placement of woody debris in the final design. The Independence Creek stream-crossing project should have no effect on woody debris.

Potential impacts on stream channel conditions. The potential impacts of suction dredging on stream channel conditions under this alternative would be the same as under alternative 2. The Lolo #5

project would significantly improve channel conditions by restoring the channel to more closely match natural stream gradients, pool-riffle ratios, and channel sinuosity. The Independence Creek improvement project should have no effect on the stream channel.

Potential impacts on bank stability. The potential impacts of suction dredging on bank stability under this alternative would be the same as under alternative 2. The banks of Lolo Creek through the Lolo #5 area are currently unstable as a result of past large-scale mining. One of the major goals of the restoration project would be to improve bank stability. The bank stabilization activities would directly reduce bank erosion, which alters the stream channel morphology and sedimentation of the creek. The Independence Creek improvement project should have no effect on bank stability.

Potential impacts on flow/hydrology. The potential impacts of suction dredging on flow/hydrology under this alternative would be the same as under alternative 2. Neither the Lolo #5 nor the Independence Creek crossing project would affect flow or hydrology.

4.6 Potential Effects on Aquatic Invertebrates

4.6.1 Alternative 1: No Action

There would be no suction dredging and, therefore, no potential impacts from mining to aquatic invertebrates in either creek under this Alternative.

4.6.2 Alternative 2: Proposed Action

The operation of small-scale suction dredges would displace some insects downstream but should result in minimal amounts of injury or mortality to aquatic insects. For a short period, while insects were in the water column before settling back into the substrate, they would be more susceptible to being eaten by fish or other aquatic organisms. This would be temporary.

Suction dredging affects on immature fish, aquatic insects, and other invertebrates were assessed in the Yankee Fork (tributary to the Salmon River near Stanley, Idaho) and Bums Creek (tributary to the South Fork Snake River) in 1980 by Griffith and Andrews (1981). They found that less than one percent of 3,623 macroinvertebrates entrained through a three-inch dredge nozzle displayed injuries or died within 24 hours. The mortality rates varied by species but were highest among emerging mayfly species. Re-colonization of the dredged areas by aquatic invertebrates was largely complete after 38 days.

Exposure of previously buried substrate and covering of existing substrate can locally reduce abundance of benthic invertebrates. However, most aquatic invertebrate species have a life history capability of re-colonizing disturbed sites within several weeks.

Royer *et al.* (1999) found that the density of aquatic invertebrates was greatly reduced in the first 10 meters downstream of an 8-inch commercial suction dredge. The abundance and diversity of invertebrates returned to values seen at the upstream reference site within 80 to 160 meters downstream of the dredge. The authors reported substantial recovery of invertebrate diversity within one year after dredging. Royer *et al.* (1999) also evaluated the impacts of small-scale recreational suction dredging on invertebrates approximately five weeks after dredging operations. They found that aquatic invertebrate density, taxa richness, and EPT richness were not significantly different between the dredged areas, 35 meters downstream, and upstream reference sites. Where dredging moves substantial amounts of substrate occupied by aquatic mollusks, re-colonization would take longer because of their low dispersal rates and limited distribution within river systems (Harvey and

Lisle 1998). Small-scale operations such as those on Lolo and Moose Creeks would not move substantial amounts of substrate.

As noted previously, dislodged fine sediment would be distributed downstream of the dredged area and could temporally fill interstices in gravel and cobble, reducing available macroinvertebrate habitat in the immediate area. Scouring action during the next high flow would likely clear out any such sediment accumulations and allow aquatic insects to re-colonize the habitat. However, continued intensive dredging of multiple claims could cumulatively reduce the habitat quality over specific areas. Thomas (1985) reported significantly lower aquatic insect abundance in a 35-foot section of stream that had just been dredged, compared to a site downstream of the operation, although re-colonization was substantially complete within one month after dredging. The low percentage of fine sediment, particularly in Lolo Creek, would significantly reduce the likelihood, and the extent, of potential temporary impacts.

4.6.3 Alternative 3: Suction Dredging and Stream Improvement Projects

Potential effects from suction dredging under this alternative would be the same as under the Proposed Action.

The Lolo #5 restoration project would disturb the entire stream width for over 1,000 feet of Lolo Creek, and this would kill or displace aquatic invertebrates in this area. Fine sediment in the disturbed area would be washed downstream and could temporarily reduce macroinvertebrate habitat. High-flow scouring would clear out any sediment accumulations and allow recolonization. Over the longer term, stabilizing banks and creating a stable channel would reduce sediment transport and improve habitat for aquatic invertebrates.

The Independence Creek improvement project, similarly, would disturb the full width of the creek and result in increased sedimentation immediately downstream until seasonal high flows scoured out accumulated sediments. Following completion of the project, the upstream reach of Independence Creek will be open to migrating fish.

4.7 Summary of Potential Impacts to Threatened and Endangered and Sensitive Fish

4.7.1 Alternative 1: No Action

There would be no potential impacts on threatened and endangered fish under this alternative.

4.7.2 Alternative 2: Proposed Action

<u>Potential Impacts on Chinook Salmon</u>. There would be no significant impacts to fall-run chinook salmon from suction dredging in Lolo Creek because the closest essential fish habitat for fall-run chinook is over 25 miles downstream. There would be no impacts in Moose Creek because the Dworshak Dam over 100 miles downstream provides a complete barrier to anadromous fish migration.

Similarly, there are no spring-run chinook in Moose Creek. In Lolo Creek, spring chinook salmon are supplemented by hatchery fish and the creek supports sizable densities of chinook. Rearing juveniles could occur during the dredging window, but the dredging operation season of July 1 through August 15 occurs after the previous year brood offspring are out of the gravel and prior to spawning. Most impacts would be limited to displacement or avoidance during the hours of

dredging activity and localized reductions in macroinvertebrate food availability. There could also be temporary food abundance due to displacement of aquatic invertebrates out of the substrate.

Potential Impacts on Steelhead Trout. The Lolo Creek steelhead population is a combination of natural and hatchery fish, and it produces very few natural steelhead due to poor adult returns and habitat conditions. The dredging season occurs after most steelhead emerge from the substrate. Small-scale suction dredge operations would have a negligible impact on adult steelhead or their spawning gravels because spawning occurs several months after dredging, during the next year's spring flows that naturally redistribute the substrate, and after recolonization by macroinvertebrates. Short-term impacts to juvenile steelhead trout could occur during the dredging season from fish being displaced away from dredging activity and from localized reductions in macroinvertebrate food availability. There could also be a temporary food abundance due to displacement of aquatic invertebrates out of the substrate.

The Biological Opinion for suction dredging in Lolo Creek (USFWS 2003) stated that the 18 projects proposed for 2003 suction dredging would not likely jeopardize the continued existence of the Snake River steelhead. Due to the natural redistribution of substrate and re-colonization of the dredge areas between August 15 and July 1 every year, the potential even for cumulative impacts from many years of small-scale suction dredge operations is minimal. No dredging will be allowed in areas where steelhead are known to spawn, or in areas the Forest Service identifies as spawning habitat (condition 5). This will prevent any impacts on steelhead spawning.

As with chinook salmon, steelhead trout do not exist in the Moose Creek drainage due to the presence of Dworshak Dam.

Potential Impacts on Bull Trout. In the Lolo Creek project area, no bull trout were identified during 1996-1999 and 2001 monitoring, despite extensive fish surveys, and only six bull trout were identified from 570 survey stations in Lolo Creek from 1987 to 1994. No bull trout were observed by the Forest Service during 2002 monitoring. The suction dredge operating season is during a period that minimizes the likelihood of bull trout being present or spawning in the project area (Chapter 2, condition 1). In August 2002, the U.S. Fish and Wildlife Service concurred with the Forest Service's determination that small-scale suction dredging proposal for the 2002-2003 season "may affect, but is not likely to adversely affect" bull trout in Lolo Creek (USFWS 2002). Any effects that did occur would likely be as described under Section 4.4.2 above.

In the Moose Creek project area, bull trout presence has been documented by several sources, but bull trout numbers were relatively low up to the year 2000. Between 1984 and 2001 bull trout were found at only 7 out of 97 snorkeling stations. However, higher numbers of adult bull trout have been found in snorkeling surveys since 2000 (USFWS 2003). Moose Creek, which is proposed as critical habitat, has good habitat for bull trout rearing but less than one percent of the stream is available for spawning habitat (Clearwater Biostudies, Inc. 1991). The impacts of small-scale suction dredging on bull trout eggs, alevins, or fry are expected to be minimal because bull trout hatch in January and February, remain in the gravel until only April or May, and then leave the gravel before the dredging season opens on July 1. Disturbance to fry would be limited to short-term impacts that would occur during the dredging season, such as temporary displacement during the hours of dredging activity and localized reductions in macroinvertebrate food availability. The impacts to instream habitat conditions would be minimal, as discussed in Section 4.5.

No dredging will be allowed in areas where bull trout are known to spawn, or in areas the Forest Service identifies as spawning habitat (conditions 3 and 6). This will prevent any impacts on bull trout spawning.

Pacific lamprey Impacts to this species may occur where slow moving waters and sandy habitat exists. This potential habitat ranges between 1.3 and 6.0 percent in the project area (Clearwater BioStudies (1999a). Given the lack of known occurrences of Pacific lamprey in the Lolo Creek project area, avoidance of their spawning window (April - July), and the low percentage of spawning and rearing habitat in the project area will not likely result in a trend toward federal listing or reduced viability of this species.

Westslope Cutthroat Trout. Impacts to cutthroat trout would be similar to those for steelhead trout and bull trout described above. Cutthroat trout populations are higher relative to steelhead and bull trout and much of their spawning habitat is in the small tributary streams. Potential impacts would be as described in Section 4.4.2.

4.7.3 Alternative 3: Suction Dredging and Stream Improvement Projects

Potential effects to threatened and endangered species from suction dredging under this alternative would be the same as under the Proposed Action.

In Lolo Creek, there could be short-term effects on chinook salmon, steelhead, bull trout, and west slope cutthroat trout from the Lolo #5 restoration project. During construction, any fish in the project area would likely be killed, dislocated, or otherwise disturbed. However, most or all fish would vacate the area as disturbance began, so there should be little to no mortality of adults or juveniles. Construction would also kill any eggs or alevins in the gravels. As noted above, sedimentation would increase immediately downstream of the project area; if there are redds or spawning habitat immediately downstream, they could be smothered with sediment, trapping or suffocating alevins from excess fine sediment deposition or oxygen depletion. Best management practices (IDL, 1992) will reduce sedimentation as much as possible. The July 1 to August 15 operating window (Chapter 2, condition 1) also reduces the risk of killing eggs or alevins during restoration. A Forest Service biologist will survey Lolo Creek in the Lolo #5 project area and immediately downstream for redds and spawning habitat. If redds or spawning habitat are identified, the Forest Service would develop appropriate avoidance and/or mitigation measures and consult with the USFWS and NMFS, as appropriate, prior to project implementation. After completion, the Lolo #5 restoration project would improve habitat in this reach of Lolo Creek and immediately downstream, and may increase the amount of spawning habitat for these species.

Neither chinook salmon nor steelhead are present in the Moose Creek watershed, so the Independence Creek crossing project would have no effect on either individual fish or populations. The project would not have an adverse effect on bull trout or west slope cutthroat trout unless there were active redds or spawning habitat immediately downstream of the crossing. If there were, they could be covered with sediment caused by construction.

The July 1 to August 15 operating window (Chapter 2, condition 1) decreases the likelihood of spawning fish being present during construction. In any event, a Forest Service biologist will survey the reach of Independence Creek immediately downstream of the crossing to evaluate whether there are any redds or spawning habitat. If there are, the Forest Service will develop appropriate mitigation measures and consult with the USFWS prior to project implementation.

4.8 Potential Effects on Wildlife

4.8.1 Alternative 1: No Action

Wildlife would continue to tend to avoid occupied campsites due to noise and the presence of humans. Seasonal hunting would continue to affect individual game animals.

4.8.2 Alternative 2: Proposed Action

The potential effects on wildlife by camping and other non-dredging activities, and by the presence of humans in the area, would be the same as under Alternative 1.

Potential impacts of noise and presence of humans suction dredging on terrestrial wildlife would be predominantly within the riparian zone along the streams. Management indicator or sensitive wildlife species possibly affected by suction dredging would include belted kingfisher and boreal toad nesting. The presence of suction dredge operations would not disturb kingfisher nesting. Once eggs hatch, brood rearing by kingfishers is essentially complete prior to the dredge-operating season. For this reason, there would be no effects on rearing young and no effects on local kingfisher population levels. Suction dredging will have no effect on the forest wide population trends for kingfisher. Foraging individuals could be locally disturbed and move away from dredging operations to hunt. Aquatic amphibians (e.g., boreal toad) could be affected through entrainment of eggs and young in the early stages of development. Approval conditions prohibit suction dredging into the banks of streams (see section 2.1.2, condition 8), which are the areas that could potentially cover amphibian eggs and preferred habitat, and this would reduce the potential for impacts on local and forest wide population levels of boreal toad.

Potential impacts to threatened, endangered, or sensitive wildlife species would be negligible. Additionally, lynx, and gray wolves are not known to inhabit the project areas. For at least 10 months of the year, the temporary noise and other human impacts associated with small-scale dredging would not likely jeopardize the continued existence of the gray wolf (USFWS 2002), and would result in no adverse effect on bald eagles, lynx, or their habitats (USFS 2006a,b).

4.8.3 Alternative 3: Suction Dredging and Stream Improvement Projects

The potential effects on wildlife by camping and other non-dredging activities, and by the presence of humans in the area, would be the same as under Alternative 1. The effects on wildlife from suction dredging under this alternative would be the same as under Alternative 2.

During construction of the Lolo #5 restoration project and installation of a drainage device or ford at the Forest Road 5440 crossing on Independence Creek, noise and human activity would cause wildlife to avoid the areas, at least during the hours of operation. Individual kingfishers and boreal toads could be disturbed and dislocated, and toads could be killed.

4.9 Potential Effects on Riparian Vegetation

4.9.1 Alternative 1: No Action

There could be impacts on riparian vegetation from streamside campers, berry-pickers, and others, but this should continue to be localized and minor.

4.9.2 Alternative 2: Proposed Action

Potential impacts on riparian vegetation under this alternative would be the same as under Alternative 1.

Riparian vegetation and wetland plant communities would not be substantially altered as a result of approving plans of operation for suction dredging in either study area. Stream banks are generally well vegetated and cobbles and boulders provide armor to the banks. Equipment would be manually moved across the riparian zone to the dredge site. In much of the study areas, this consists of a narrow strip of habitat between the streams and the Forest Service roads. Moving equipment to the stream banks may trample existing vegetation. Areas along streambanks that are disturbed as a result of suction dredging operations (including camping) have to be revegetated or otherwise restored at the end of the operating season (Chapter 2, conditions 9 and 10).

Suitable habitat for Macfarlane's four-o'clock *(Mirabilis macfarlanei),* water howellia *(Howellia aquatilis)* and Ute ladies'-tresses, *(Spiranthes diluvialis)* was modeled as part of the Endangered Species Act consultation process for ongoing projects. The Lolo Creek and Moose Creek watersheds did not contain suitable habitat for the three federally listed plants. Spalding's catchfly *(silene spalding)* is found in mesic fescue grasslands and ponderosa pine-Idaho fescue savannas, neither of which are found along, or are affected by, the valley bottom of the stream for mining, therefore, there will be no effect to any of these species (USFS 2002a, b).

Several sensitive plant species may be found in riparian areas of the Lolo and Moose Creek drainages (see Table 3-12 in Section 3.2.6). Approval conditions provide substantial protection for vegetation along streams, thereby minimizing impacts that may occur to sensitive plants. In addition, areas within 300 feet of Lolo Creek are within the Riparian Habitat Conservation Area, which provides protection from major disturbances of riparian vegetation. The BAs for both Lolo Creek and Moose Creek (USFS 2006a, b) concluded that the proposed action would have no impact on sensitive plant species.

4.9.3 Alternative 3: Suction Dredging and Stream Improvement Projects

Potential impacts on riparian vegetation under this alternative would be the same as under Alternative 2. Impacts to riparian vegetation and wetland plant communities from approved suction dredging would be the same as under Alternative 2. The restoration of Lolo Creek in the Lolo #5 area would have a short-term adverse effect on the existing vegetation and wetlands during construction, but would ultimately increase channel stability and increase the stability and quality of riparian habitat by reducing future damage from high stream flows. The Forest Service would identify and delineate any jurisdictional wetlands in the Lolo #5 project area and comply with any applicable requirements under Section 404 of the Clean Water Act.

4.10 Potential Effects on Recreation

4.10.1 Alternative 1: No Action

Under the No Action Alternative, the Forest Service would not approve proposed plans of operations. Because most operators consider that their suction dredging has a significant recreational component, this type of recreation would decrease in the project areas. This decrease would likely be offset by other recreationists using the same campsites.

There would be no change in the Recreation Opportunity Spectrum (ROS) under this alternative.

4.10.2 Alternative 2: Proposed Action

There should be minimal or no impacts to total recreation visitation and no change in the ROS in either watershed under this alternative. Most people camping in the immediate vicinity of current suction dredging operations are miners, so the impacts of noise from the suction dredge pumps and/or compressors would not be expected to be annoying, or not as annoying as they would be to non-miners. Because non-mining campers generally prefer other areas for camping while mining is occurring, and authorizing a limited number of suction dredge operations it is likely there would be no increase or decrease in campsite concentration in the project area, and thus no overall change in the number of recreational visitors.

The physical presence of suction dredges and associated noise during operation may detract from the recreational fishing experience during the mining season for some fisherman. The total area proposed for suction dredging will be less than one (1) percent of the total area of mainstem Lolo Creek (USFS, 2006a). In the short term, suction dredge operations dislodge insects and other food organisms from the substrate. Suction dredge operators note that there is a temporary increase in fish feeding on the dislodged insects and organisms in the dredge pit and directly downstream of their suction dredge operations. Fishing opportunity does exist on more than ninety-nine (99) percent of the total area of mainstem Lolo Creek and on dredge sites in the late afternoon or evenings when the suction dredge operations stop for the day. Thus, there would be no significant impact on recreational fishing.

During the 45-day mining period each year, visitors to either of the historic trails in the Lolo Creek area could be annoyed by noise or by evidence of modern man. See Section 4.12 for potential noise levels.

4.10.3 Alternative 3: Suction Dredging and Stream Improvement Projects

The potential effects of suction dredging under this alternative would be the same as under Alternative 2. In addition, there would be some minor effects on recreational use from implementation of the stream improvement projects under this alternative.

Heavy equipment would be needed for both the stream restoration in Lolo Creek and the crossing improvement project on Independence Creek. This should not affect suction dredge operators. There would be noise and visual disturbance for the duration of the construction projects, however, which could have a minor effect on other recreational visitors. Because there are abundant other areas with the same or better recreational opportunities, there would be no significant effect on recreation from this alternative, and no change to the ROS in either watershed.

4.11 Potential Effects on Visual Resources

4.11.1 Alternative 1: No Action

No change to the Visual Quality Objectives (VQOs) would be expected, and no impacts to visual resources would occur under this alternative.

4.11.2 Alternative 2: Proposed Action

Overall, neither of the study areas is very diverse, with a low to moderate degree of inherent scenic attractiveness. The VQOs of the travel routes and trails near Lolo Creek are managed from

Retention to Partial Retention (see Section 3.2.8). It is not expected that there would be any change to VQOs under this alternative.

It is possible that suction dredge operations could be seen from either of the historic trails but this is unlikely due to topographic and vegetative screening. Views from the Lolo Creek Campground area would also be limited. Similarly, in both creeks some suction dredge operations could be visible to visitors on nearby roads, but this is unlikely due to topographic and vegetative screening.

4.11.3 Alternative 3: Suction Dredging and Stream Improvement Projects

The impacts from suction dredging would be the same as Alternative 2. During implementation of the stream restoration project in Lolo Creek and the crossing improvement on Independence Creek, heavy equipment would be visible from the road and nearby trails for the duration of the projects. It is not expected that there would be any change to VQOs under this alternative.

4.12 Potential Effects from Noise

The Federal Interagency Committee on Urban Noise defined noise impact zones and established guidelines for land use compatibility. These guidelines identified residential uses, unless treated with adequate noise insulation, as incompatible with noise exposure levels of DNL 65 decibels (dB) and higher. However, these guidelines apply to urban or urban type settings and not wildland settings. Guidelines have not been developed for natural or wildland settings. For this analysis, impacts from noise focus on hearing loss and annoyance.

Noise-induced hearing loss is caused by exposure to excessive noise. Federal workplace standards for protection from hearing loss allow a time-average level of 90 dB over an 8-hour work period, or 85 dB averaged over a 16-hour period. Because the average miner works the claim for less than 6 hours per day, it is unlikely that the noise from pumps and/or compressors used for the dredge mining would cause a health impact.

The primary effect of engine noise on exposed visitors is one of annoyance. Noise annoyance is defined by EPA as any negative subjective reaction on the part of an individual or group (USEPA 1972). Although not measured, it is likely the background noise level in these study areas are in the 25 to 45 decibel range (see Section 3.2.9).

4.12.1 Alternative 1: No Action

Both the Lolo Creek and Moose Creek drainages are in heavily forested natural environments. The creeks, wind, local topography, and vegetation all influence the acoustical environment. Similarly, noise from generators and other equipment on campsites, and from passing vehicles on Forest Service roads, would be audible to visitors. In Lolo Creek, the primary sensitive noise receptors in the study area would be visitors in the Lolo Creek Campground and on the Nez Perce National Historic Trail or Lewis and Clark National Historic Trail. There are no sensitive noise receptors in the Moose Creek area other than non-mining recreational visitors. As shown on Figure 3-4, noise from the sources expected under this alternative could be expected to range from background up to about 75 dB, with the louder noises likely to be of short duration and/or at some distance to receptors.

4.12.2 Alternative 2: Proposed Action

Potential impacts on noise levels from traffic and recreational use would be the same as under Alternative 1. Noise from a small-scale suction dredge operation would involve noise associated with the pump used to dredge material from the stream bottom and in some cases an air compressor used to supply air to the dredge operator. There is no blasting associated with suction dredge mining. Operators typically use dredges powered by engines rated at 10 horsepower (hp) or less, but can use up to 15 hp engines to power their dredges. The maximum noise level for gasoline engines rated at 12 hp to 15 hp could range up to 85 dB at very close range (see Figure 3-4 and Table 4-1). The actual noise levels would depend on many variables, including distance between the receptor and the source, wind, atmospheric pressure, other weather conditions, topography, time of day, etc.

Unlike a resident, who is exposed to repeated noise events over time, a visitor may or may not experience a noise event during a visit. The people potentially affected during the mining periods would mostly be the miners themselves, hikers, fishermen, and other dispersed campers in the area.

Table 4-1. General Noise Levels of 18 Horsepower Engine

Distance (Meters)	*Decibel Level*
4	85
50	63
100	57
150	53
300	47
Note: Based on Briggs and Stratton 18 hp engine	

The historic trails in the area (see Section 3.2.9) are considered noise-sensitive areas due to their historic significance and their location in a wildland area. In the upper end of the Lolo Creek study area, as shown on Figure 2-1, the Nez Perce National Historic Trail passes within about 200 meters of sections of Lolo Creek where suction dredge operations may occur. During the 45-day dredging season, hikers on the trail may be able to hear pump and/or compressor noise under favorable conditions (existence of active operation, wind, direction and speed, for example). At this distance, noise would be only slightly elevated over "background" (57 dB at 100 meters, compared to "background" that ranges up to 45 dB); this would last only as long as it took the listener to traverse the area, which should not be an extended period, since the trail only parallels Lolo Creek for three to four miles and is close to the creek for much less than that.

The Lewis and Clark trailhead is about 0.75 miles from Lolo Creek. It is unlikely that noise from suction dredging would even be heard under the most favorable conditions.

4.12.3 Alternative 3: Suction Dredging and Stream Improvement Projects

Noise from suction dredging under this alternative would be the same as under Alternative 2. There would be noise from the heavy machinery used for both projects, both engine noise and the "beeping" signals used when machinery is in reverse gear. The noise level about 50 feet from a heavy truck would be approximately 70-80 dB, somewhat higher than the noise from a suction dredge pump at the same distance. Noise levels would decrease at increasing distances.

4.13 Potential Effects on Socioeconomics

For purposes of evaluating the economic impacts of suction dredging as a result of each alternative action, the estimated expenditures that would occur as a result of actions under the alternative were compared to the total income of the nearest county with a sizable city. In the case of Lolo Creek, this would be Clearwater County, which also is the residence of most prospective operators and the residence of many other Forest visitors and campers. In 2000, as noted in Section 3.2.10 in Chapter 3, the per capita income of the 8,930 residents of Clearwater County was $15,463 (Department of Commerce 2001). For Moose Creek, the nearest city is Missoula, which is located in Missoula County, Montana. In 2000, as noted in Section 3.3.10, the county had a population of 95,802 and a per capita income of $17,808 (Department of Commerce 2001).

4.13.1 Alternative 1: No Action

Visitors to CNF come from across the country, but a large majority is from the Pacific Northwest. Most visitors reside in northern Idaho, eastern Washington, and northeast Montana, with fewer visitors from increasing distances.

As noted previously, the Forest Service assumes that the number of visitors and campers in the Lolo Creek study areas would be approximately the same whether suction dredging plans of operations are approved or not. For purposes of this analysis, it is assumed that there would be 36 campers along Lolo Creek from July 1 through August 15, and 60 campers along Moose Creek.[13]

Also for purposes of this analysis, the Forest Service assumed that expenditures for each visitor under Alternative 1 would be approximately $50 per day (for food, fuel, camping supplies, and other supplies) while camping or visiting the National Forest, and that all of that amount would be spent in Clearwater County. This approach significantly overestimates expenditures and any resultant economic impacts, since it is very unlikely that there would be this many operations in any given year and all expenses would not be concentrated in one county.

In Lolo Creek, estimated expenditures would be $82,800 per year[14]. Even this overestimated amount, concentrated in Clearwater County, would amount to less than 0.06 percent of the county's total annual income.[15] This would have a negligible effect on county or larger-scale economies. In Moose Creek, total expenditures would be $138,000 per year.[16] This overestimated amount, concentrated in Missoula County, would amount to less than 0.01 percent of the county's total

[13] The assumption is based on the maximum number of operations that the Forest Service believes could be active in any year (up to 18 in the Lolo Creek study area and up to 30 in the Moose Creek study area, as described in Chapter 2), and on an assumption that each operation would involve two persons visiting or camping. Further, the overall assumption is based on the expectation that, in the absence of mining, other visitors would desire about the same degree of solitude and so would camp at the same density as suction dredge operators. The camping season is assumed to be the same as the dredging season.

[14] 36 campers × $50/camper/day × 46 days/year = $82,800/year

[15] Total income in Clearwater County = 8,930 residents × $15,463 per capita income = $138,084,590. Total expenditures in Clearwater County = $82,800. Percentage of income expended on camping would be total expenditures divided by total income: $82,800 ÷ $138,084,590 = 0.0006, or 0.06 percent.

[16] 60 campers × $50/camper/day × 46 days/year = $138,000/year

annual income.[17] This level of expenditure would have a negligible effect on county or larger-scale economies.

As noted in Section 3.2.10 and 3.3.10, the amount of gold that is recovered by small-scale suction dredge operators is not known, so the loss of income that would result from not approving suction dredge plans of operations cannot be accurately estimated. Several of the dredge operators state that the gold recovered supplements their income. Only one of the prospective operators is known to rely on suction dredging as their sole source of income, or even as a major source of income. However, the Forest Service does not believe the total amount is significant, and so the loss of income under this alternative would not have a significant effect on local or larger-scale economies.

4.13.2 Alternative 2: Proposed Action

The socioeconomic effects from the Proposed Action would be the same as under Alternative 1 except for expenditures made specifically to support the suction dredging operations. Suction dredges cost approximately $5,000 and they last for approximately 10 years before having to be replaced. In addition, each operator could expect to spend about $300 per year for fuel, maintenance, food, and incidental costs. Total expenditures for each operator would thus be about $800 per year.[18]

Expenditures for suction dredging for the 18 Lolo Creek operators would be an estimated $14,400 (18 × $800 = $14,400). Combined with expenditures from camping ($82,800, as calculated under Alterative 1), total expenditures due to Lolo Creek operations would be $97,200 per year. This would be 0.07 percent of Clearwater County's total annual income, which would have a negligible effect on county and larger-scale economies.

Expenditures for suction dredging for the 30 Moose Creek operations would be an estimated $24,000 year (30 x $800/year). Combined with expenditures from camping ($138,000, as calculated under Alternative 1), total expenditures due to Moose Creek suction dredging would be $162,000. This would be less than .01 percent of Missoula County's total annual income, which would have a negligible effect on county and larger-scale economies.

The Forest Service does not know the amount of gold recovered by small-scale suction dredge operations, so cannot estimate the economic effect of the increased income from mining. However, the Forest Service does not believe it would have a significant effect on county or larger-scale economies.

4.13.3 Alternative 3: Suction Dredging and Stream Improvement Projects

The socioeconomic effects from camping and other visitors would be the same as under Alternative 1, and the effects from approving suction dredge operations would be the same as under Alternative 2. The two stream improvement projects under this alternative would be completed within Clearwater National Forest budgets; if these two projects were not implemented then other projects would be substituted, and total Forest expenditures in the area would remain unchanged. Thus, there would be no additional socioeconomic effects under this alternative.

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[17] Total annual income in Missoula County = 95,802 residents × $17,808 per capita income = $1,706,042,016. Total expenditures in Clearwater County = $138,000. Percentage of income expended on camping would be total expenditures divided by total income: $138,000 ÷ $1,706,042,016 = 0.00008., or 0.008 percent.

[18] $5,000 /10 years + $300/year = $800/year.

4.14 Potential Effects on Heritage Resources

Under Federal law, impacts to heritage resources may be considered adverse if the resources are significant. Significant resources are generally eligible for, or listed in, the National Register of Historic Places (NRHP) or have significance for traditional cultural groups. An NRHP-listed or -eligible resource is an historic property. An action results in impacts to a historic property when it alters the resource's characteristics, including relevant features of its environment or use, in such a way that it no longer qualifies for listing in the NRHP. Impacts to traditional resources, which may or may not be eligible for the NRHP, are identified in consultation with the affected groups, such as Native American tribes.

4.14.1 Alternative 1: No Action

No impacts to heritage resources will occur as a result of suction dredging or stream improvements in either study area under the No Action Alternative. Heritage resources would continue to be managed in compliance with Federal law and Forest Service regulations.

4.14.2 Alternative 2: Proposed Action

Suction dredging could affect heritage resources in both the Lolo Creek and Moose Creek study areas. However, it was determined that suction dredging will not adversely affect known NRHP-eligible heritage resources in the study areas (Vallier, 2004).

Reaches of creeks in both study areas have been subject to major disturbance from past large-scale mining and the stream channels may have been moved as a result. It is possible that artifacts of mining operations, or of Native American occupation or activities, could have been covered with mine tailings or other disturbed materials that now are in the stream channel that could be suction dredged. Suction dredge operators will be informed about the importance of historic features and will not be allowed to excavate, disturb, or reuse historic materials or features. Sites at or near dredge locations will be periodically monitored during the dredging activities to insure compliance with operating plans, including avoidance of historic properties. Forest Service regulations and policy require that discovery of any potential heritage resource be left alone and reported to the District Ranger and Forest archaeologist. Should a suction dredge operator uncover a resource while working, work would be stopped immediately, pending inspection by the Forest archaeologist. If the Forest archaeologist identifies NHRP-eligible resources, mitigation measures would be identified in consultation with the Idaho State Historic Preservation Office and (if Native American resources are potentially affected) tribal groups.

As noted in Chapter 3, Moose Creek and its tributaries hosted extensive historic mining activities beginning in the late 19th century (1860s) and continuing through the 20th century. There are many mining sites and features along the creek, including the location of the NRHP-eligible Johnson/Pollock Cabin (10CW146) used from about 1880 through the 20th century. During nearly 150 years of mining, the configuration of the drainages in the study area have changed. Since claims were located throughout the drainage bottoms, it is likely that the stream now flows through claims that were worked in the 19th century. Sites may also be located in the creek matrix or fill zones along the creek margins. Until a formal determination of NRHP-eligibility is made, all claim sites that are historic in age are treated as eligible for inclusion in the NRHP.

4.14.3 Alternative 3: Suction Dredging and Stream Improvement Projects

Potential impacts from approving suction dredge plans of operations would be the same as under Alternative 2. In addition, the Lolo #5 stream improvement project under this alternative would have the potential to adversely impact archaeological or architectural/engineering resources in both the Lolo Creek. The ground-disturbing actions associated with stream improvement projects will not adversely affect known historic mining sites and Native American resources along, and within, the creeks (Vallier, 2004). Earth-moving in the Lolo #5 project area could reveal heritage resources (e.g., flumes or sluice boxes) buried under tailings piles. Work will be stopped immediately if any such resources are identified during construction, pending inspection by the Forest archaeologist. If the Forest archaeologist identifies resources eligible for the National Register of Historic Places, mitigation measures would be identified in consultation with the Idaho State Historic Preservation Office and (if Native American resources are potentially affected) tribal groups.

Compliance with Section 106 of the National Historic Preservation Act, including survey and eligibility evaluation of potentially affected resources, was completed for the study areas. Mitigation measures requires involvement during the planning and monitoring of the construction by the Forest Archaeologist. Other measures include informing suction dredge operators about the importance of historic features, and not allowing dredge miners to excavate, disturb, or reuse historic materials or features. Sites at or near dredge locations will be periodically monitored during the dredging activities to insure compliance with operating plans, including avoidance of historic properties. Forest Service regulations and policy require that discovery of any potential heritage resource be left alone and reported to the District Ranger and Forest archaeologist. Should a suction dredge operator uncover a resource while working, work would be stopped immediately, pending inspection by the Forest archaeologist. If the Forest archaeologist identifies NHRP-eligible resources, mitigation measures would be identified in consultation with the Idaho State Historic Preservation Office and (if Native American resources are potentially affected) tribal groups

Installation of a properly designed stream crossing on Independence Creek would disturb only the existing ford and a small area around the ford.

4.15 Potential Effects on Nez Perce Treaty Rights and Traditional Uses

The remainder of this section describes the potential impacts of the alternatives on tribal treaty rights.

As noted in Section 3.4 of Chapter 3, the Nez Perce Tribe has "... the right of taking fish at all usual and accustomed places...together with the privilege of hunting, gathering roots and berries…." Historically, hunting included such game animals as deer, elk, moose, bear, mountain sheep and goats (Nez Perce Tribe 2002). Small game included rabbit, squirrel, badgers, and marmots. Birds, such as ducks, geese, ruffed grouse, and sage hens were also hunted (Nez Perce Tribe 2002). Estimates suggest that the majority of Nez Perce historical resource use focused on the acquisition of fish, including Chinook, coho, chum and sockeye salmon, and lamprey (USFS 2002e). Non-anadromous fish included dolly varden, lake and cutthroat trout, squawfish, suckers and sturgeon. Roots gathered for winter storage included camas, bitterroot, khouse, wild carrot, wild potato, and other root crops (Nez Perce Tribe 2002). Fruit collected included serviceberries, gooseberries, hawthorn berries, thorn berries, huckleberries, currants, elderberries, chokecherries, blackberries, raspberries, and wild strawberries. Pine seeds/nuts, sunflower seeds, and black moss were also collected (Nez Perce Tribe 2002).

4.15.1 Fishing

4.15.1.1 Alternative 1: No Action

Impacts to tribal treaty rights or traditional uses relating to fish are not expected under this alternative. Tribal fishing would continue as it presently does. The Nez Perce Tribe would continue to operate the hatchery on Yoosa Creek in the Lolo Creek watershed, and continuing activities under this alternative are likely to have no effect.

4.15.1.2 Alternative 2: Proposed Action

Impacts to tribal fishing access and traditional tribal resources could result under this alternative in one (1) percent of the total area of mainstem Lolo Creek where suction dredge activities are proposed (USFS, 2006a). During the July 1 to August 15 mining season, there are times during the day in the areas where dredges are operating, that may not be the most desirable for tribal fishermen. Dredging noise, activities in and near the streams may scare away salmon, and the presence of non-tribal members may make for a climate that is less than optimal for this traditional practice. More than ninety-nine (99) percent of the remaining area of the mainstem is not proposed for dredging. Dredging would have no impact on tribal treaty rights or traditional uses in these areas.

As noted in Section 4.4 (Fisheries), suction dredge operations may also affect isolated fish (either adult or juvenile), but would not affect the survival of any species. Under the terms and conditions listed in chapter 2, dredge sites must be located in areas of large substrate not preferred for spawning steelhead trout and bull trout, and operators are required to conduct all dredge mining 50 feet or more from identified spawning areas (see section 2.1.2).

The Nez Perce Tribe has identified salmon as an integral part of tribal religion, culture, and physical sustenance, and has indicated that the annual return of the salmon allows the transfer of traditional values from generation to generation (CRITFC 2002). The tribe has indicated that Lolo Creek is an important stream in restoration efforts for chinook salmon in the Clearwater River Subbasin (Mancuso 1996). Spring Chinook are present in Lolo Creek during the July 1 to August 15 suction dredge season, and the Clearwater National Forest has maintained contact with the Nez Perce Tribe to identify other potential impacts to tribal fishing.

4.15.1.3 Alternative 3: Suction Dredging and Stream Improvement Projects

Potential effects to tribal fishing access from suction dredging under this alternative would be the same as those identified for Alternative 2. In addition, restoration of the Lolo #5 claim area would improve fish habitat in this reach of Lolo Creek, which would have a beneficial effect on tribal fishing. A potential beneficial effect on tribal fishing also could result from the removal of the partially fish-blocking ford on Independence Creek and the installation of a drainage device and/or ford at the Forest Road 5440 crossing of Independence Creek. This would improve upstream access to nearly four miles of Independence Creek. The present ford is a partial barrier to fish migrating upstream for spawning during low flows, and removal of the ford would result in a minor enhancement of populations of those species. Clearwater National Forest has maintained contact with the Nez Perce Tribe to identify other potential impacts to tribal fishing.

4.15.2 Hunting

4.15.2.1 Alternative 1: No Action

Impacts to tribal hunting are not expected under this alternative. Tribal hunting on Forest land would continue as it presently does.

4.15.2.2 Alternative 2: Proposed Action

Under the proposed action, tribal hunting and traditional tribal resources could be affected during the mining season due to avoidance of the area by game animals. An incremental impact from approval of dredge mining could be noise-induced avoidance of the stream corridors by wildlife in the vicinity of suction dredge operations during daylight hours. Any increase in game animal avoidance should be minimal. The sites would continue to be used for camping, and the nearby roads would remain in use as under the No Action Alternative.

Alternative 3: Suction Dredging and Stream Improvement Projects

Impacts to tribal hunting and traditional tribal resources under this alternative would be similar to those identified for Alternative 2. In addition, tribal hunting could be affected during stream improvement projects when construction equipment is operating, due to avoidance of the areas by game animals. This impact is expected to be temporary, ending when construction is complete.

4.15.3 Gathering Activities

4.15.3.1 Alternative 1: No Action

Impacts to tribal gathering are not expected under this alternative. Tribal gathering on Forest land would continue as it presently does.

4.15.3.2 Alternative 2: Proposed Action

Direct impacts to tribal gathering from suction dredging are not expected under this alternative. Camas, whitebark pine seeds, berries, and other commonly gathered foods are not found in the stream channel, and are not expected to be directly affected. Historically gathered foods are listed above.

Indirect impacts to adjacent tribal gathering areas could occur. In October of 2001, the BLM contacted the Nez Perce Tribal Ethnographer, Josiah Pinkham regarding traditional resources. On November 12, 2001, two BLM staff members toured part of the present project area with Pinkham as part of another project that overlaps the Lolo Creek study area (White/White Timber Sale). At that time, Pinkham identified six traditional gathering areas, one of which is on the bank of Lolo Creek. Additional areas could also lie in the Lolo Creek study area. The exact location of traditional resources is considered confidential and is not provided to members of the public. The CNF has maintained contact with the Nez Perce Tribe to identify potential impacts to tribal gathering resources in the Lolo Creek area.

4.15.3.3 Alternative 3: Suction Dredging and Stream Improvement Projects

The effects on gathering under this alternative would be the same as described for the proposed action. In addition, potential impacts to streamside gathering areas could occur during stream improvement projects in the Lolo Creek area. The Clearwater National Forest has maintained

contact with the Nez Perce Tribe to identify whether potential impacts to tribal gathering would occur under this alternative.

4.16 Potential Cumulative Effects

4.16.1 Past, Present and Foreseeable Cumulative Effects in Lolo Creek Watershed

In the past, Lolo Creek has been impacted by road construction, timber harvest, mining, and grazing practices that added sediment to the stream (see Appendix C). The watershed area of Lolo Creek above Musselshell Creek covers 26,886 acres. The Lolo Creek drainage above Musselshell Creek has had timber harvested on 42 percent of the area since 1954. About 218 miles of roads have been constructed, creating an average density of 5.2 miles of road per square mile (USFS 2002c). Grazing allotments have been managed on approximately 20 percent of the watershed, primarily at the lower elevations, and past wildfires have occurred on 3,800 acres, approximately 47 percent of the watershed. Direct impacts from these former activities (mostly road construction and timber harvest) are still evident in the stream channels. Although instream conditions are considered static, modeling indicates the current trend is hydrologic recovery in the watershed and decreasing sediment delivery to the stream channels (USFS, 2001a).

The Forest Service (2003a) reports that erosion and sedimentation are historical processes that can be considered as "background" effects, and are ongoing whether there are human activities or not. Present and future management actions such as road construction, timber harvest, and fire suppression do not directly or indirectly add new processes to the existing natural forces; they may, however, change the frequency and magnitude of the processes.

Instream recovery is expected to slowly occur in the next several decades. Lee MacDonald's research (MacDonald 1989) also suggests that cumulative effects, both in the form of water and sediment yield, are impossible to detect in streams of this size. USFS (2001a) has also shown an improving trend in cumulative watershed sediment effects on a Forest-wide scale.

Timber harvest. Past timber and salvage sales have treated approximately 9,206 acres in the Lolo Creek Drainage above Musselshell. The 22,662 acres listed in Appendix C are the total estimated Timber Sale acres. The number includes overlapping timber and salvage sale treatments, which required entering the same acreage 2 to 3 times.

Ongoing and planned timber harvest or burning projects including Pioneer Thinning and White White Timber Sale are designed to meet the Forest Plan "No Effect" (on streams) standard or the Forest Plan Lawsuit Settlement Agreement, so there would be no additional direct and indirect effects on sediment loadings (WATBAL, 2002a). There would be some local noise, and projects may be visible from some vantage points.

Road construction and road maintenance. A total of 98.1 miles of roads constructed in the Lolo watershed above Musselshell are located within 300 feet of stream channels and have the potential to be hydrologically connected to these streams. WATBAL (2002a) predicted no accumulated sediment in Lolo Creek from road construction and logging activities. However, sediment does accumulate behind log weirs that have been placed in the creek to improve fishery habitat, but were not designed to pass sediment.

There are 299 road-stream intersections within the watershed, where the potential for stream alteration and disruption of sediment and woody debris transport is greater. Road maintenance and

culvert replacement are designed to reduce sediment and the risk of culvert failure. Gravel placement, rocking, installing additional relief culverts, and cleaning ditches and culverts also reduce sediment. Routine maintenance involves clearing roads of fallen rocks and trees as well as checking culverts and ditches for obstructions and unplugging if needed to maintain drainage. The use of best management practices (IDL, 1992) and Forest Service guidelines prevents sediment from reaching the creek. The presence of heavy equipment would create some noise during the short period of time the equipment was in any specific area, but this would be minor and very short-term.

Road decommissioning and Culvert replacement. 2.6 miles of the roads have been decommissioned in the Lolo watershed above Musselshell, and 2.55 miles of road will be decommissioned in 2005. In the foreseeable future 12.65 additional miles of road will be decommissioned, and 14.9 miles of road will be placed in intermittent storage. In the past, 3 fish passage culverts were installed in this part of the drainage and 5 more culverts were installed in 2005.

Replacement of culverts will result in short term direct sediment delivery to Lolo Creek. Road decommissioning may also result in short term direct sediment delivery. Culvert replacement and road decommissioning will ultimately benefit the drainage by decreasing road density, sediment, and improving fish and amphibian passage.

Grazing. Cattle grazing is ongoing. There are two cattle grazing allotments within the Lolo Creek Suction Dredging analysis area -- the Musselshell Allotment and the Eldorado Canyon Allotment. Cattle potentially can have a direct effect on riparian vegetation and stream banks in the flat areas near Lolo Creek. This damage would be most apparent in those small selected areas where the animals congregate and bed down. Both grazing and trampling can potentially damage riparian vegetation. Cattle have been seen on some of the roads within the Lolo Creek study area, but maintaining fences and the administration of the permittee permit in accordance to the terms and conditions set forth in the allotment management plan minimizes direct and indirect effects. The proposed small-scale suction dredging will not add to the cumulative effects from grazing noted in the baseline data.

Lewis and Clark Bicentennial. The downstream Lewis and Clark Trail is expected to attract numerous visitors in 2005 and 2006. Short-term direct effects would include increased traffic on Forest arterial roads and its associated noise and fugitive dust.

Mining. Small dredge ponds and berms of overburden are evidence of past placer mining in the vicinity of the Utah/Lolo Creek confluence. The specific date of the mining activity is unknown. In the mid 1970's Lolo #5 was placer mined with a dozer and backhoe. Small-scale suction dredging has occurred in the Lolo Creek project area from 1970's to 2001.

Pioneer mine exploration is ongoing bonded prospecting and exploration. The mining claimant uses hand tools to sample and process material from the mine waste pile. He also opened 2 shafts with hand tools in 1997. Sampled material is processed in a small settling pond. The project is designed to have no direct or indirect effect to Dutchman Creek.

The Forest Service anticipates that suction dredge mining will not contribute to cumulative impacts in Lolo Creek except as described in the descriptions of potential impacts to the various resource areas.

4.16.2 Past, Present and Foreseeable Effects in Moose Creek Watershed

Most past activities in the Moose Creek watershed were in the Deadwood, Independence, and Osier Creek watersheds. Along Moose Creek itself, dragline mining occurred from the mouth of Moose Creek to approximately two miles above the Deadwood Creek confluence. The dragline greatly impacted the channel, which continues to show the effects. Stream banks remain unstable and a majority of the original channel substrate has been sorted and moved by the dragline activities. There are 158 miles of road at a density of 2.2 miles per square mile in the watershed.

Timber harvest. Timber harvesting and broadcast burning were also conducted in the Moose Creek watershed between 1958 and 1988. The Forest Service acquired 4360 acres of the watershed from Potlatch Corporation in a 1996 land exchange in the Moose Creek drainage. The previous owners harvested timber and constructed roads on an estimated 3360 of the acquired land. A total of 4853 acres was also harvested and broadcast burned on National Forest land (USFS 2003c). The sum of the acquired land and remaining harvested and broadcast burned Forest lands amounts to 17.7 percent of the watershed (See Appendix C).

Mining. Documented past mining projects include the 1957 dragline mining of the Lilly Placer, which has since been patented. The dragline impacts are discussed in the preceding paragraph. The Black Bear Exploration on Independence Creek and G and G mining near the West Fork of Osier both occurred in 1988. The Black Bear Exploration involved digging an exploration pit and settling pond. Both the pit and the pond were reclaimed in 1988. G and G mining was a placer mining venture that targeted elluvial gold on nearby ridge. The Site involved mining several panels and construction of a settling pond. The Black Bear and G and G projects directly delivered sediment into the stream when the projects were implemented. Since 1988, the soil has stabilized and has revegetated. At this time, there are no direct or indirect impacts from either site.

The Crawford Mining exploration is a bonded ongoing mining activity. The claimant constructed an adit in 1997 and continues to work an underground vein with hand tools. The claimant is also proposing to explore an existing adit with hand tools. The mine sites are located on a dry ridge well away from live water. The claimant is required to comply with State of Idaho BMPs and his activity results in no direct or indirect effects to Osier Creek.

Road Maintenance. Road maintenance is the only significant Forest Service management action undertaken in the recent past or currently, and is the only action currently planned. There are 41 miles of roads in Moose Creek analysis area, or which 12 miles of Forest Roads 255 and 5434 are routinely maintained as needed. Both roads were bladed in 2003, and the 255 road was resurfaced with gravel about six years ago. Other roads in the drainage are not graded until there is a timber sale or other need, and gravel is only added as needed. The use of best management practices (IDL, 1992) and Forest Service guidelines prevents sediment from reaching the creek. The presence of heavy equipment would create some noise during the short period of time the equipment was in any specific area, but this would be minor and very short-term.

Instream conditions are now considered static, modeling indicates the current trend is hydrologic recovery in the watershed and decreasing sediment delivery to the stream channels. Therefore, instream recovery is expected to slowly occur in the next several decades. Lee MacDonald's research (MacDonald 1989) suggests that cumulative effects, both in the form of water and sediment yield, are impossible to detect in streams of this size. USDA (2001a) has also shown an improving trend in cumulative watershed sediment effects on a Forest-wide scale.

4.17 Irreversible and Irretrievable Commitment of Resources

Gold and fossil fuels are the only natural resources that would be committed irreversibly. The amount of gold recovered by suction dredge operations is not known, but is not likely to be significant at the levels considered in this EIS. Relatively small amounts of fuel are used by small gas engines driving suction dredge pumps and compressors, and their use would have no effect on regional supplies. In addition, occasional fish may be killed, as described in Section 4.4. The Forest Service in consultation with regulatory agencies has determined that this mortality would not jeopardize the survival of any threatened or endangered species.

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5.0 Compliance with Applicable Environmental Statutes and Regulations

This chapter identifies and briefly describes statutes, implementing regulations, and executive orders potentially applicable to the proposed action and alternatives. The following sections provide a brief summary of the relevant aspects of the respective law, regulation, or executive order. Where there are conclusions on compliance, they are based on the impact analysis presented in Chapters 3 (Affected Environment) and 4 (Environmental Consequences). Section 5.1 describes the statutes under which the Forest Service manages National Forest System lands, including Clearwater National Forest. Section 5.2 describes how minerals are managed on National Forest System lands. Sections 5.3 through 5.13 describe Federal statutes, regulations, and executive orders that govern how environmental resources are managed, and Section 5.14 describes Idaho regulations specific to small-scale suction dredges.

5.1 Forest Management

5.1.1 Forest Service Organic Administration Act of 1897

The *Organic Act* (16 U.S.C. 473-478, 479-482 and 551) is the original organic act governing the administration of National Forest System lands, and now is one of several laws under which the Forest Service manages National Forest System lands (see below for others). The Organic Act permits access to National Forests for all lawful purposes, including prospecting for, locating, and developing mineral resources.

5.1.2 Federal Land Policy and Management Act of 1976

FLPMA (43 U.S.C. 1701-1782) is the organic act for the Bureau of Land Management (BLM), which manages the mineral resources on all federal lands, including National Forest System lands, and administers mining claims under the Mining Law of 1872 (see Section 5.2.1 below).

5.1.3 National Forest Management Act of 1976

The *National Forest Management Act* (NFMA) (16 U.S.C. 1600-1614) amended (and largely replaced) the Forest and Rangeland Renewable Resources Planning Act of 1974. NFMA required the Forest Service to assess National Forest System lands and develop a management program based on the principles of multiple use and sustained yield. The Forest Service also was required to develop and implement comprehensive Land Use and Resource Management Plans (which are known as LRMPs or "Forest Plans") for each unit in the National Forest System. These Forest Plans guide and coordinate multiple uses and the availability of lands for resource management. Plan development and implementation have to include:

- Interdisciplinary approach
- State and local coordination
- Public participation in planning process
- Multiple-use and sustained yield of products and services.

The *Forest Plan* for Clearwater National Forest (USFS 1987) was developed in compliance with NFMA. The Forest Plan establishes goals, objectives, and standards for the management of all resources of the Forest, including minerals (pages II-3, II-7, and II-30). Minerals goals, objectives, and standards discuss the need to facilitate the orderly development of mineral commodities and

provide for timely, reasonable, effective and economically feasible environmental protections. The Forest Plan was amended in 1995 by the Decision Notice/Decision Record, Environmental Assessment, and Finding of No Significant Impact for management of anadromous fish-producing watersheds on Federal Lands in eastern Oregon and Washington, Idaho, and portions of California (PACFISH). The Forest Plan was also amended in 1995 by the Decision Notice and Finding of No Significant Impact for the Inland Native Fish Strategy for managing fish-producing watersheds in eastern Oregon and Washington, Idaho, Western Montana and portions of Nevada (INFISH). PACFISH and INFISH provide guidance and monitoring requirements for minimizing impacts to surface resources, especially in relationship to Riparian Habitat Conservation Areas. This EIS is tiered to PACFISH and INFISH plan and analysis document contents not in conflict with Forest Service locatable mineral regulations found at 36 CFR 228A.

5.1.4 Forest Service Surface Use Regulations and Guidelines

Forest Service regulations at 36 CFR Part 228 Subpart A (also known as the *228 Regulations*) set forth rules and procedures for use of the surface of National Forest System lands in connection with mineral operations. The regulations direct the Forest Service to prepare the appropriate level of environmental analysis and documentation when proposed operations may affect surface resources. These regulations do not allow the Forest Service to deny entry or preempt the miners' statutory right granted under the 1872 Mining Law. The regulations require the Forest Service to develop mitigation measures to minimize adverse impacts on National Forest resources. The 228 regulations include requirements for reclamation.

The *Forest Service Manual* (FSM) codifies the Forest Service's policies, practices, and procedures and serves as the primary basis for internal management and control of all Forest Service programs. FSM Section2800 reiterates that the authority to manage the exploration and development of mineral resources within the National Forest System is jointly shared by the Secretaries of Interior (BLM) and Agriculture (Forest Service). The Department of the Interior administers the mining laws, and the Forest Service manages occupancy and use of the land's surface both on and off mining claims. Section 2800 also discusses specific responsibilities and considerations for dealing with proposed Plans of Operation. It states that the Forest Service should minimize or prevent adverse impacts related or incidental to mining by imposing reasonable conditions that do not materially interfere with operations.

5.2 Minerals Management

5.2.1 Mining Law of 1872

The major Federal law governing the disposition of so-called locatable minerals[19] on Federal lands is the *Mining Law of 1872*, as amended (30 U.S.C. 22-54). This law provides citizens of the United States the opportunity to explore for, discover, and purchase certain valuable mineral deposits on Federal lands that remain open for that purpose (as do most lands in the Lolo Creek and Moose Creek study areas). The law also sets general standards and guidelines for claiming the possessory rights to valuable minerals discovered during exploration.

[19] "Locatable" minerals are one of three categories into which minerals on federal lands are classified: locatable, leasable, salable. In general, locatable minerals include both metallic minerals (gold, silver, lead, etc.) and nonmetallic minerals (fluorspar, asbestos, mica, etc.), although several factors influence the category into which a mineral falls under various circumstances. In the Lolo Creek and Moose Creek study areas, gold is considered a locatable mineral.

Under this law, a mine locator (the claimant) "...shall have the exclusive right of possession and enjoyment of all the surface included within the lines of their locations and of all veins, lodes, and ledges throughout the entire depth." While miners have rights under the 1872 Mining Law, they are legally required to comply with the rules and regulations covering National Forests (16 U.S.C. 479). They are also required to comply with applicable laws passed since 1872 that have placed additional requirements upon miners. Many of these laws are described in this chapter. (See the sidebar on page 1-8 for an overview of mining claims)

5.2.2 Multiple Use Mining Act of 1955

This law (16 U.S.C. 612) is known variously as the *Multiple Use Mining Act,* the *Surface Resources and Multiple Use Act*, the *Multiple Use Surface Act*, and the *Multiple Surface Use Mining Act.* The law specifies that unpatented mining claims located after July 23, 1955, may not be used for any purposes other than prospecting, mining or processing operations and uses reasonable incident thereto. That such claims shall be subject to the right of the United States to manage and dispose of vegetative surface resources and to manage other surface resources, and the right of the United States, its permittees, and licensees, to use so much of the surface as may be necessary for such purposes or for access to adjacent land.

5.2.3 Mining and Mineral Policy Act of 1970

The *Mining and Mineral Policy Act* (30 U.S.C. 21a) states that it is the continuing policy of the Federal government to foster and encourage private enterprise in the development of economically sound mining and minerals industries and the orderly and economic development of domestic mineral resources to help satisfy industrial, security, and environmental needs.

5.3 National Environmental Policy Act

NEPA (42 U.S.C 4321 *et seq.)* was the first of what has come to be an array of statutes whose individual and collective goals are the protection of the human and natural environment from a variety of impacts that human activity can have. NEPA is the nation's basic environmental charter, and requires that Federal agencies consider the environmental consequences of their actions. NEPA requires that a "detailed environmental statement" (that is, an Environmental Impact Statement, or EIS) be prepared for "...major federal actions significantly affecting the quality of the human environment." The EIS must provide detailed information regarding the proposed action and feasible alternatives, the environmental impacts of the alternatives, potential mitigation measures, and any adverse environmental impacts that cannot be avoided if the proposal is implemented. Agencies are required to demonstrate that these factors have been considered by decisionmakers prior to undertaking actions. Clearwater National Forest determined that the potential impacts to threatened and endangered species, as described in the Biological Assessments (USFS 2002a, b and 2006a, b) and resulting Biological Opinions (USFWS 2002, 2003, 2004, 2006; NMFS 2003, 2004, 2006), required that the approval of small-scale suction dredge operations by evaluated in an EIS.

This EIS has been prepared in compliance with NEPA regulations promulgated by the Council on Environmental Quality (40 CFR 1500-1508) and with the Forest Service Manual.

5.4 Clean Water Act

The *Clean Water Act* (33 U.S.C. 1251 *et seq.*) was established to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters" (Section 101(a)). The Clean Water Act sets

goals to eliminate discharges of pollutants into navigable water, protect fish and wildlife, and prohibit the discharge of toxic pollutants in quantities that could adversely affect the environment. A number of interrelated provisions of the Act establish the structure by which these goals are to be achieved, through a variety of Federal and State programs. Two sections of the Clean Water Act, Sections 402 and 404, are potentially applicable to the suction dredging operations that might be approved under Alternative 2 (Proposed Action) or Alternative 3 (Stream Improvement Projects).

5.4.1 Clean Water Act Section 402

Section 402 requires that discharges of pollutants from "point sources" be permitted under the National Pollutant Discharge Elimination System (NPDES). Authority to implement the NPDES program may be delegated by EPA to authorized states; in Idaho, however, EPA administers the program and issues all permits. EPA has determined that discharges from suction dredge operations, even small-scale operations, qualify as point sources and require NPDES permit authorization. In some states, EPA or authorized states have issued a "general" permit to cover multiple small-scale suction dredge operations; no such permit has been issued to date in Idaho, so each suction dredge operation requires an individual NPDES permit. The Forest Service cannot approve proposed plans for operations unless the operator has sought coverage for its discharges under the NPDES program. Under the development of a TMDL for Lolo Creek, NPDES permits for suction dredging operations will be required to comply with all load allocations specified in the TMDL.

5.4.2 Clean Water Act Section 404

Section 404 establishes a program to regulate the discharge of dredged and fill material into the waters of the U.S. This act requires authorization from the Secretary of the Army, acting through the Corps of Engineers, for the discharge of dredged or fill material into all waters of the U.S., including wetlands. The Section 404 program is administered by both the Corps of Engineers and EPA. Corps of Engineers regulations are promulgated as 33 CFR Parts 321-330. In the case of suction dredge operations, tailings (that is, gravel and other overburden from which gold has been recovered) are discharged back into the creeks. The Corps of Engineers has determined that small-scale suction dredging operations authorized by the Idaho Department of Water Resources under a recreational dredge permit will not require a Section 404 permit (Idaho DWR 2003). See Section 5.14 for a description of this permit.

Wetlands are considered "waters of the United States," and the Section 404 program is the principal means by which wetlands are protected. There will be no effects on wetlands from suction dredge operations approved by the Forest Service under Alternative 2 (Proposed Action) other than minor effects on riparian vegetation, as described in Section 4.9 in Chapter 4. Under Alternative 3 (Stream Improvement Projects), the restoration of Lolo Creek in the Lolo #5 area would have a short-term adverse effect on the existing vegetation and wetlands, but would ultimately increase channel stability and increase the stability and quality of riparian habitat by reducing future damage from high stream flows. Prior to implementation of the restoration project, the Forest Service would identify and delineate any jurisdictional wetlands in the Lolo #5 project area and comply with any applicable Section 404 requirements.

5.5 Executive Order 11990

Executive Order (EO) 11990, *Protection of Wetlands*, encourages federal agencies to take actions to minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands when undertaking Federal activities and programs. As noted, there

could be a short-term adverse effect on wetlands under Alternative 3, but the long-term effect would be positive.

5.6 Endangered and Threatened Species and Critical Habitat

5.6.1 Endangered Species Act

The purpose of the *Endangered Species Act* (ESA) (16 U.S.C. 1531-1544) is to conserve "the ecosystems upon which endangered and threatened species depend" and to conserve and recover listed species. Species may be listed as "endangered" if it is in danger of extinction throughout all or a significant portion of its range, or as "threatened if it is likely to become endangered within the foreseeable future. Two agencies have principal responsibilities for administering the law: the Department of the Interior's Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS). The USFWS has primary responsibility for freshwater and terrestrial organisms, while NMFS is responsible for marine (and anadromous) species. Section 7(a) of the Endangered Species Act requires Federal agencies to consult with USFWS and/or NMFS, as appropriate, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or adversely modify or destroy their critical habitats.

Clearwater National Forest has consulted with both USFWS and NMFS. ESA Section7(c) and federal regulations on endangered species coordination (50 CFR 402.12) require that federal agencies prepare biological assessments (BAs) of the potential effects of major actions on listed species and critical habitat. USFWS and NMFS then issue their Biological Opinion as to the degree to which an agency's action will jeopardize the continued existence of endangered or threatened species or adversely modify or destroy their critical habitats.

Clearwater National Forest prepared and submitted two BAs for the Proposed Action, one for species and critical habitat in Lolo Creek (USFS 2006a) and one for Moose Creek (2006b). For Lolo Creek, the Biological Assessments determined that suction dredging was "likely to adversely affect" steelhead trout, but was "not likely to adversely affect" Lolo Creek bull trout. For Moose Creek, the Forest Service determined that suction dredging was "likely to adversely affect bull trout"[20]. In their respective Biological Opinions, NMFS (2006) and USFWS (2006) agreed with the Forest's determinations. Both agencies further concluded that suction dredging would not jeopardize either species if specific conservation measures minimizing impacts to streams and minimizing take were adopted. These conservation measures, and other measures deemed appropriate by Clearwater National Forest, are included as conditions of approval under Alternative 2 (Proposed Action) and Alternative 3 (Stream Improvement Projects). For all other species of concern, the BAs determined that there would be no adverse effect as a result of suction dredging.

Potential effects of the proposed alternatives on fisheries, wildlife, and special status species are described in Sections 4.7 and 4.8.

5.6.2 Fish and Wildlife Coordination Act

The *Fish and Wildlife Coordination Act* (FWCA) of 1980 (16 U.S.C. 661 *et seq.*) provides for the conservation and management of fish and wildlife by encouraging cooperation between the USFWS

[20] Steelhead are not listed in Moose Creek because their upstream migration is blocked by the Dworshak Dam and so are not present in the watershed.

and other federal, state, and local public agencies, as well as private agencies. It also calls for consultation with USFWS when any water body is impounded, diverted, controlled, or modified for any purpose. USFWS and state agencies charged with administering wildlife resources are to conduct surveys and investigations to determine the potential damage to wildlife and the mitigation measures that should be taken. USFWS incorporates the concerns and findings of the state agencies and other Federal agencies, including NMFS, into a report that addresses fish and wildlife factors and provides recommendations for mitigating or enhancing impacts to fish and wildlife affected by a Federal project. The Federal project must include justifiable measures that address USFWS recommendations and concerns.

None of the alternatives evaluated in this EIS involved impoundment, diversion, control, or modification of water bodies, so no consultations with USFWS were required. As noted in Section 4.3 and 4.7 of Chapter 4, the Forest consulted with USFWS (and NMFS) concerning threatened and endangered species.

5.7 Heritage Conservation

5.7.1 National Historic Preservation Act

Section 106 of the *National Historic Preservation Act* (NHPA) (16 U.S.C. 470) requires that federal agencies evaluate the effects of their actions on historical, archaeological, and cultural resources and afford the Advisory Council on Historic Preservation opportunities to comment on the proposed undertaking. The first step in the process is to identify cultural resources included in (or eligible for inclusion in) the National Register of Historic Places (NRHP) that are located in or near the project area. The second step is to identify the possible effects of proposed actions. The lead agency must examine whether feasible alternatives exist that would avoid such effects. If an effect cannot reasonably be avoided, measures must be taken to minimize or mitigate potential adverse effects. Potential impacts to heritage resources and proposed mitigation are described in Section 4.14.

The Clearwater National Forest is required to comply with Section 106 of the NHPA prior to approving proposed plans of operations or implementing under Alternatives 2 and 3 or the Lolo #5 restoration project under Alternative 3. The Forest has initiated contact with the Nez Perce Tribe to identify potential traditional cultural resource concerns in the study area.

5.7.2 Archaeological Resources Protection Act

The *Archaeological Resources Protection Act* (ARPA) (16 U.S.C. 470aa-470ll) provides for the protection of archaeological sites located on public and Indian lands, establishes permit requirements for the excavation or removal of cultural properties from public or Indian lands, and establishes civil and criminal penalties for the unauthorized appropriation, alteration, exchange, or other handling of cultural properties. There are heritage resources in the vicinity of the project areas, but not likely within the streams where suction dredging would take place under Alternatives 2 and 3. If significant cultural resources are encountered during suction dredging, operators are required to stop work until they have notified the Forest archaeologist. There could be cultural resources within or underneath the tailings that would be disturbed in the Lolo #5 restoration area under Alternative 3. The Forest Service will consult with the State Historic Preservation Office prior to implementing this project.

5.7.3 Native American Graves Protection and Repatriation Act

The *Native American Graves Protection and Repatriation Act* (NAGPRA) (25 U.S.C. 3001) addresses the discovery, identification, treatment, and repatriation of Native American and Native Hawaiian human remains and cultural items (associated funerary objects, unassociated funerary objects, sacred objects, and objects of cultural patrimony). This Act also establishes fines and penalties for the sale, use, and transport of Native American cultural items. Consistent with procedures set forth in applicable federal laws, regulations, and policies, the USACE will proactively work to preserve and protect natural and cultural resources, establish NAGPRA protocols and procedures, and allow reasonable access to sacred sites. There are no known Native American graves in the vicinity of the study areas.

5.7.4 American Indian Religious Freedom Act

The *American Indian Religious Freedom Act* (AIRFA) of 198 (42 U.S.C. 1996) established protection and preservation of Native American's rights of freedom of belief, expression, and exercise of traditional religions. Courts have interpreted AIRFA to mean that public officials must consider Native American's interests before undertaking actions that might harm those interests. Clearwater National Forest will continue to coordinate with the potentially affected Native American tribe, the Nez Perce.

5.7.5 Executive Order 13175

EO 13175, *Consultation and Coordination with Indian Tribal Governments* (November 6, 2000) requires establishment of regular and meaningful consultation with tribal officials in the development of federal policies that have tribal implications, to strengthen the government-to-government relationships with Indian tribes, and to reduce the imposition of unfunded mandates on Indian tribes. Clearwater National Forest has initiated contact with the Nez Perce regarding the proposed action so that potential traditional resource concerns can be identified.

5.7.6 National Trails System Act of 1968

The *National Trails System Act* (16 U.S.C. 1241-1249) and its amendments authorized a national system of trails and defined four categories of national trails. It listed the route of the Lewis and Clark expedition for study and possible designation as a National Scenic Trail.

5.7.7 The National Parks and Recreation Act

The *National Parks and Recreation Act of 1978* (16 U.S.C. 2501-2514) amended the National Trails Act and named the Lewis and Clark Trail as one of four National Historic Trails.

5.7.8 The Nez Perce National Historic Trail Act

The Nez Perce National Historic Trail Act of 1986 (16 U.S.C. 1244) amended the National Trails System Act to create the Nez Perce National Historic Trust.

5.8 Executive Order 11988, Floodplains

If a Federal agency program will affect a floodplain, the agency must consider alternatives to avoid adverse effects in the floodplain or to minimize potential harm. EO 11988 requires Federal agencies to evaluate the potential effects of any actions they might take in a floodplain and to ensure that planning, programs, and budget requests reflect consideration of flood hazards and floodplain

management. Suction dredging will have no effect on the floodplains of Lolo Creek or Moose Creek.

5.9 Air Quality

The Clean Air Act (42 U.S.C. 7401 *et seq.*) was established "to protect and enhance the quality of the nation's air resources so as to promote public health and welfare and the productive capacity of its population." This law authorizes EPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and the environment. The Clean Air Act establishes emission standards for stationary sources, volatile organic compound (VOC) emissions, hazardous air pollutants, and vehicles and other mobile sources. The Act also requires the states to develop implementation plans applicable to particular industrial sources. The Air Quality Division (AQD) of the Idaho Division of Environmental Quality (IDEQ) implements the Clean Air Act in Idaho to ensure that all sources comply with the NAAQS.

The Lolo and Moose Creeks study areas are remote unpopulated locations. Because of this, and the minimum 100 feet spacing between individual suction dredge operations (Chapter 2, p. 2-6), the ID Team determined that air emissions of pollutants from the small engines used by suction dredge operators would be negligible. They are so minor that the do not require permits or approvals, hence, did not need to be evaluated in this FEIS.

5.10 Executive Order 12898

This Executive Order, *Federal Actions to Address Environmental Justice in Minority and Low Income Populations,* directs federal agencies to identify and address, as appropriate, disproportionately high and adverse health and environmental impacts on minority and low-income populations. There is no human population in the vicinity of the project sites. As described in Chapter 3, the Nez Perce Tribe holds treaty rights for fishing, hunting, and gathering in both Lolo Creek and Moose Creek. Clearwater National Forest has initiated consultations with the Nez Perce regarding the proposed action and alternatives. Potential impacts on Tribal Treaty Rights are described in Section 4.15.

5.11 Executive Order 13045

Executive Order 13045, *Protection of Children from Environmental Health and Safety Risks,* requires federal agencies to ensure that their policies, programs, activities, and standards address potential risks that may disproportionately affect children. It defines environmental health and safety risks as risks to health or to safety that are attributable to products or substances that a child is likely to come in contact with or ingest. The range of alternatives considered in this EIS will not produce risks to the health and safety of children.

5.12 Idaho Stream Channel Protection Act

Idaho regulates small-scale dredge mining under this Act (Idaho Code Section 42-3803(a)). Small-scale dredges, termed "recreational" by the State, are defined as those mining activities in which miners use power sluices, suction dredges with a nozzle 5 inches in diameter or less, and equipment rated at a maximum of 15 horsepower. This is also the size cutoff for this EIS, and suction dredges not qualifying as "recreational" under this statute would not qualify for approval under the Proposed Action.

The statute requires dredge operators to obtain a Section 404 permit from the Idaho Department of Water Resources before any suction dredge mining can be done. In each of the past several years, approximately 400 suction dredge operations have been authorized to operate in Idaho each year.

To be authorized to operate under the permit, operators must adhere to a number of conditions intended to protect water quality, habitat, and fish. The Forest Service has included most of these conditions as conditions of approval under Alternative 2 (Proposed Action) and 3 (Stream Improvement Projects). One of the approval conditions under Alternatives 2 (Proposed Action) and 3 (Stream Improvement Projects) is that operators be authorized under a stream alteration permit from the State. In addition, many of the conditions of approval under these alternatives are the same as under the State permit.

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6.0 Preparers and Contributors

This EIS was prepared with the technical assistance of Science Applications International Corporation (SAIC), using data collected by Clearwater National Forest and contractors. Forest Service and SAIC staff who participated in the analysis and preparation of this EIS are identified in Table 6-1.

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APPENDIX A

WATER QUALITY AND HYDROLOGY REPORT

February 2004
(Revised September 2004)

Prepared for:

Clearwater National Forest
Orofino, Idaho

Prepared by:

An Employee-Owned Company

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TITLE PAGE

Project:	Small-Scale Suction Dredging Project, Environmental Impact Statement for Proposed Actions in Lolo Creek and Moose Creek Watersheds
Document Title:	Draft Water Quality and Hydrology Report
Preparer:	Science Applications International Corporation (SAIC)
Prepared for:	U.S. Forest Service, Clearwater National Forest
Project Manager:	Jack Mozingo
Principal Author:	Tim Reeves
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DISCLAIMER

This report was prepared by Science Applications International Corporation (SAIC) for the Clearwater National Forest (Forest Service), Idaho. This draft report has not been reviewed by or approved by the United States Forest Service and thus does not represent their conclusions or opinions. The report was prepared under contract.

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1.0 INTRODUCTION AND BACKGROUND

The Clearwater National Forest is a geographically diverse area in central Idaho that contains occurrences of gold, silver, antimony and copper. Since the 1860s, placer gold mining has occurred in rivers and streams across the Forest. Two of the more productive streams, Lolo Creek and Moose Creek (including two Moose Creek tributaries, Independence Creek and Deadwood Creek), have had sporadic mining activity over the years. Figure 1-1 depicts locations of the Lolo and Moose Creek drainages within the Clearwater National Forest. With the rise in prices in the 1970s, both streams experienced a renewed interest in prospecting for gold. It was also around this time that prospectors started using suction dredges to explore and mine instream gravels. While the numbers who actually mine varies from year to year, miners have established and maintained 28 placer mining claims on Lolo Creek and 18 claims on Moose Creek within the Clearwater National Forest. The claims were made under the Mining Law of 1872 and Forest Service regulations at 36 CFR Part 228. Lolo Creek and Moose Creek are most frequently mined by part-time, small-scale operations using suction dredges with nozzles from two to five inches in diameter and gasoline-powered pumps.

Until the late 1990s, Lolo Creek and Moose Creek miners conducted their suction dredge operations under Forest Services Regulations (40 CFR Part 228) by notifying the Forest of their activities through a Notice of Intent (NOI). In 1997, steelhead trout were listed as a threatened species within the Snake River drainage under the Endangered Species Act (ESA). In 1998, bull trout were also listed as a threatened species within the Snake River drainage.

In a 2002 Biological Assessment (BA) completed by the Forest for Lolo Creek (Clearwater National Forest 2002a), the determination was made that suction dredging was "likely to adversely affect" steelhead trout, but was "not likely to adversely affect" Lolo Creek bull trout. In a BA for Moose Creek (Clearwater National Forest 2002b), the Forest determined that suction dredging was "likely to adversely affect bull trout"[1]. In their respective Biological Opinions (BOs), the National Marine Fisheries Service (NOAA Fisheries, 2002) and the United States Fish & Wildlife Service (USFWS, 2002) agreed with the Forest's determinations. Both agencies further concluded that suction dredging would not jeopardize either species if specific conservation measures minimizing impacts to streams and minimizing take were adopted.

Because approving small-scale suction dredging action may adversely affect species listed as threatened or endangered under the Endangered Species Act, the Forest Service has determined that an Environmental Impact Statement (EIS) must be prepared in accordance with the National Environmental Policy Act (NEPA) to evaluate and disclose the potential environmental impacts that would be associated with approving suction dredging in the Lolo Creek and Moose Creek drainages, and of feasible alternatives.

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[1] Steelhead are not listed in Moose Creek because their upstream migration was blocked by a downstream dam and so they are not present.

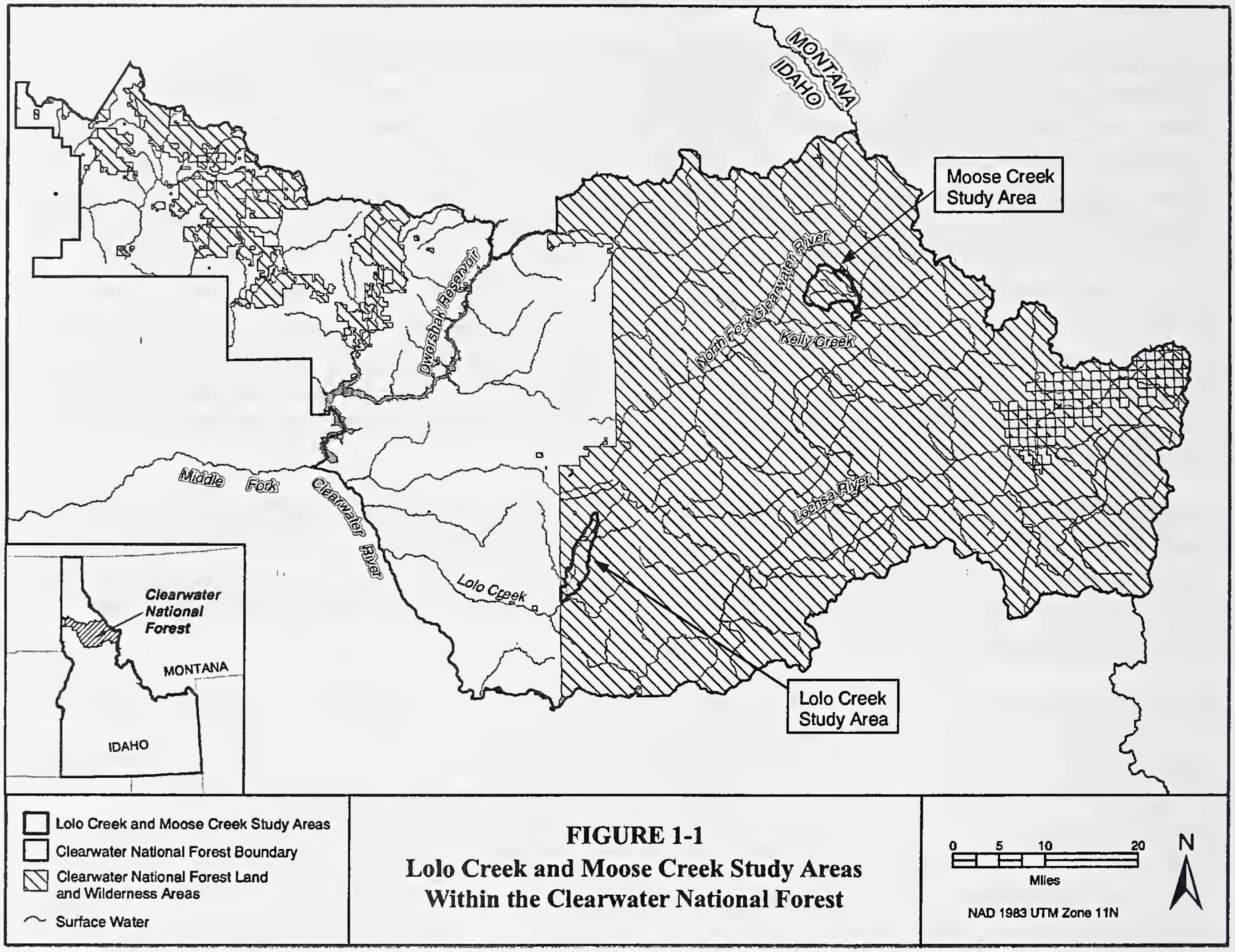

FIGURE 1-1
Lolo Creek and Moose Creek Study Areas Within the Clearwater National Forest

This report was prepared to provide an analysis of available baseline data concerning hydrology and water quality within the Lolo Creek and Moose Creek drainages. The purpose of this report is to provide detailed data and analysis to support the preparation of the Environmental Impact Statement (EIS) to evaluate effects on hydrology and water quality from the proposed action and alternatives. The report was prepared using available reports, information, and data supplied by the Clearwater National Forest. Section 2 of this report describes current conditions (i.e. the affected environment) of these watersheds and Section 3 of this report analyzes potential impacts that would be associated with the proposed alternatives.

2.0 AFFECTED ENVIRONMENT

2.1 Lolo Creek

2.1.1 Watershed Description

Lolo Creek is a major tributary to the Middle Fork Clearwater River, near Greer Idaho. The size of the Lolo Creek watershed from its mouth is 243 square miles, with 42 square miles being above Musselshell Creek (USFS 2003a). The watershed ranges in elevation from 1,098 feet at its mouth and 2,775 feet at the U.S. Forest Service Boundary, to 6,051 feet at its headwaters (Clearwater Biostudies, Inc. 1998). Parts of Lolo Creek were placer mined in the 1970s and early 1980s. This was associated with the Lolo #5 mining claim and was called the Collette Mine. This site has not been reclaimed.

Beneficial uses listed for the Clearwater River are domestic water supply, cold-water biota, salmonid spawning, primary contact recreation, and special resource waters (Idaho Department of Environmental Quality [IDEQ] 2000). The State of Idaho has not listed beneficial uses for Lolo Creek. Beneficial uses listed in the Forest Plan for the Lolo Creek watershed are steelhead trout and cutthroat trout (United States Forest Service [USFS] 1987). Water Quality Limited Segments (WQLS) are streams where the State of Idaho has identified water quality concerns. Downstream of the project area, the State identified Lolo Creek below Eldorado Creek as having water quality concerns from bacteria, dissolved oxygen, flow alteration, habitat alteration, nutrients, oil and grease, sediment, and temperature on their final 1998 303(d) list (IDEQ 1999b). In 2003, the State of Idaho prepared an updated Draft water quality report that proposed listing Lolo Creek from its headwaters to the confluence with Yakus Creek as not meeting designated uses from the same constituents that were listed for Lolo Creek below Eldorado Creek. This listing is not final and is subject to data review by the State and EPA. Under the Clean Water Act (CWA), a finalization of the proposed listing will require that a Total Maximum Daily Load (TMDL) be prepared for Lolo Creek. A TMDL ultimately establishes a scientifically-based-strategy for correcting the impairment and restoring the water body to designated uses. Under the development of a TMDL for Lolo Creek, permits under the National Pollutant Elimination System (NPDES) for suction dredging operations will be required to comply with all load allocations specified in the TMDL.

Tributaries within the Lolo Creek project area include Nevada Creek, Mike White Creek, White Creek, Utah Creek, Siberia Creek, and Dutchman Creek. Intermittent streams are rare as most streams are perennial that emerge near ridges. The drainage density within the Lolo Creek watershed is 4.1 miles of stream per square mile (USFS 2002c). The Lolo Creek drainage above Musselshell Creek has had timber harvested on 42 percent of the area since 1954. About 218 miles of roads have been constructed, creating an average density of 5.2 miles of road per square mile (USFS 2002c). Grazing allotments have been managed on approximately 20 percent of the watershed, primarily at the lower elevations, and past wildfires have occurred on 3,800 acres, approximately 47 percent of the watershed.

Clearwater National Forest resource hydrology and fisheries specialists analyzed the Clearwater watershed condition for hydrologic integrity in 1997 (USFS 2003a). Lolo Creek was rated as having a “moderate” condition (USFS 2002b). A “high” condition is defined as a watershed having a robust condition in which no long-term changes occur even with major storm events. These watersheds have stable drainage networks and are in a desired functional condition. A watershed with a “moderate” condition is not meeting the requirements of a watershed in a “high” condition but still

maintains a dynamic equilibrium and is functioning within its geomorphic threshold. Moderate watersheds often have higher levels of instream sediment, but the stream network remains stable. Most of the streams in the Lolo Creek drainage were rated moderate because of relatively high levels of cobble embeddedness (i.e. relatively high levels of sediment surrounding stream cobbles and bedrock).

2.1.2 Climate

Precipitation within the Lolo Creek watershed is driven by Aleutian Low and Pacific High maritime air masses (USFS 2003a). Aleutian lows that are prevalent in winter bring periods of heavy precipitation as snow and spring rains. Rain on snow events are common, and these can cause flooding. The summer climate is driven by predominant Pacific highs causing hot, dry weather. Precipitation during this period often occurs as short-term, high intensity thunderstorms. Although there are no precipitation or SNOTEL stations in the watershed, the Clearwater National Forest has estimated average annual precipitation to be 40 inches per year with over half the annual precipitation contributing to stream flow (USFS 2003a).

2.1.3 Geomorphology

The Lolo Creek watershed above Musselshell creek has moderate topographic relief. Generally, land types are rated moderate to high for sediment delivery efficiency, and many stream channels are moderately to extremely sensitive to changes in flow and sediment (USFS 2003a). Sediment deliverery efficiencies in this watershed are relatively high because of a relatively high drainage density; especially in first and second order streams higher in the watershed, and distance to stream channels are relatively short. This means that sediment generated on hillsides and steep slopes does not have long distances to travel to stream channels.

USFS (2003a) reports that these are basically historical processes that can be considered as "background" effects, and are ongoing whether there are human activities or not. Management actions such as road construction, timber harvest, and fire suppression do not add new processes to the existing natural forces; they may, however, change their frequency and magnitude.

Lolo Creek has predominantly B3 and C3 channel types as defined by the Rosgen (1994) method (USFS 2002a). In general, Type B channels are dominated by riffles with some reaches containing "rapids" and infrequently spaced scour-pools at bends or areas of constriction. Type C channels have lower gradients and are dominated by riffle/pool systems. The numbers given to the stream types generally describe the material making up the channel substrate such that 1 is bedrock, 2 is boulder, 3 is cobble, 4 is gravel, 5 is sand and 6 is silt/clay (Rosgen 1994). Studies conducted by the Clearwater National Forest in 1998 showed that Lolo Creek had an average gradient of 2.0 percent (USFS 2002a). Results of these studies are provided in Table 2-1. Channel stability was rated "good" on 22 reaches and "fair" on 15 reaches. Mean channel stability for the 37 reaches is 77.1 or "fair". The mean stream bank stability rating was 4.9 in 1993 and 4.7 in 1998. The overall decrease in stable stream banks was attributed to high flows in 1995 and 1996 (USFS 2002a). The survey identified one area (Reach LO-34) where past mining activities caused a substantial decrease in bank stability. Lolo Creek Reach LO-34 is unstable due to localized activities that occurred at the Collett Mine. In this reach, unstable stream banks have increased from 56 to 418 meters per kilometer. All reaches, except LO-34 are stable, however cobble embeddedness levels (i.e. the amount of sediment surrounding cobbles and bedrock in the substrate) exceed Desired Future Condition (DFC) of 30 to 35 percent as defined by the Forest Service. Cobble embeddedness in 1993 was 44.7 percent and in

1998 was 42.8 percent. Cobble embeddedness levels in Lolo Creek are associated with natural geomorphic conditions and past management (USFS 2002a).

Numersous monitoring studies have been conducted by Clearwater National Forest to evaluate sediment levels and particle size distributions in the substrate of Lolo Creek. Wolman pebble counts (Wolman 1954) were collected in the summer of 1998 in Lolo Creek below Yoosa Creek, above White Creek and below Nevada Creek (USFS 2002a). The Wolman pebble count data were collected in three riffles in each reach, representing over 600 individual particle size measurements for each reach. In addition, cores were abstracted from the deeper substrate of the creek and also analyzed for particle sizes. Figure 2-1 depicts combined results from the pebble counts and subsurface cores showing the percent distribution for several particle size classes. Percent distribution is shown by size class and as an accumulated percentage. These data show a normal distribution of particle sizes in the surface substrate for all three reaches. This distribution is typical of channels that are geomorphologically stable with only moderate levels of substrate sediment. An evaluation of Figure 2-1 shows that particle sizes making up less than 2 mm or less are approximately 12 percent of the surface substrate and 13 percent of the subsurface substrate. The United States Department of Agriculture defines particle sizes between 2 mm and 0.05 mm as sand and particle sizes between 0.05 mm and 0.002 mm as silt (Brady 1974). These data indicate that a very small amount of the substrate material consists of sands, silts, and clays, while a majority of the material is made up of larger gravels, cobbles and rock.

2.1.4 Stream and Sediment Discharge

Clearwater National Forest applied a flow-sediment yield model (WATBAL) to evaluate potential effects from the proposed White-White timber sale in upper Lolo Creek above Musselshell Creek in 2002 (USFS 2002a). The WATBAL model was used to predict the relative differences in sediment yields that occur naturally, based on land-types and management activities. Based on WATBAL, the Lolo Creek watershed (above Musselshell Creek) has 40 inches of precipitation annually (86,278 acre-feet) and 18 inches of runoff (38,192 acre-feet) (USFS 2002a). The watershed efficiency is 44 percent, which is common for forested montane stream systems. Natural sediment production was estimated at 6 tons per square mile per year. This would be considered the average rate of erosion and sediment transport through a natural system.

The Forest Plan standard for Lolo Creek is a C channel type, steelhead high fishable stream (USFS 1987). The approximate maximum sediment loadings that generally support this criterion are 50 percent over natural. The approximate maximum sediment loadings that generally support this criterion are 50 percent over natural. Sediment production should be at or below 35 percent over natural for 20 out of 30 years. Current sediment production in Lolo Creek was 44 percent over natural in 2002 and exceeded 35 percent over natural for 17 out of 30 years (USFS 2002a). Therefore, Lolo Creek does not meet the Forest Plan sediment standard.

In 2002, Equivalent Clearcut Acres (ECA) was 11.5 percent in the upper Lolo Creek watershed, but Clearwater National Forest indicates that this level is declining (USFS 2002a). WATBAL showed a peak flow increase of five percent over natural for 2002. This is less than the level of 15 to 20 percent that is considered to be potentially detrimental to the stream system. WATBAL predicted no accumulated sediment in Lolo Creek from road construction and logging activities. However, sediment does accumulate behind log weirs that have been placed in the creek to improve fishery habitat, but were not designed to pass sediment.

Stream discharge, suspended sediment, turbidity, and bedload have been monitored at the Section 6 Bridge on Lolo Creek since 1986. Results show low levels of suspended sediment and turbidity with no significant trend over time (Table 2-2). These turbidity data represent nearly 1,000 samples collected since 1986, all of which remain below the State turbidity standard of 50 NTU. These data show that sediment production in Lolo Creek is meeting State water quality standards.

Bedload is a measurement of sediment and larger size particles that move by saltation (i.e. jumping), rolling, or sliding along the stream bottom. Bedload can be added to the suspended load to determine the total sediment load for a stream. A total of 141 bedload samples have been taken at the Lolo Creek Section 6 Bridge monitoring station between 1980 and 2002. Table 2-3 shows average monthly stream discharge, suspended sediment concentration, suspended sediment load, bedload and total sediment load. These data show the relationship between stream discharge and the total transport of sediment throughout the year. Peak stream discharge occurs in April and May with peak total sediment loads ranging between 11,665 pounds per day (lbs/day) in April and 12,378 lbs/day in May. Total sediment load is reduced approximately 10 fold with lower stream flows later in the water year. The average total sediment load for July is 1,780 lbs/day and 957 lbs/day in August. These data further show that a majority of the total sediment load is suspended. The bedload ranges between 5 percent and 48 percent of the total sediment load. Relationships between mean monthly stream discharge and sediment load are depicted in Figure 2-2.

The relationship between stream discharge and sediment transport, depicted in Figure 2-2, is related to stream velocity. There are several factors, such as channel width, depth and slope that determine the velocity of a stream at any given flow rate and at any given point. However, the velocity of the water flowing in a stream generally increases with increasing stream flow. Increasing higher velocities are required to entrain (i.e. dislodge) suspend and transport increasingly larger sizes of sediment material. As flow velocity decreases, sediment particles settle out according to size. At low velocities the stream only has enough energy to keep very fine sediments (i.e. silts and clays) suspended. Sand and larger fractions drop out to the channel substrate.

A relationship between stream discharge and stream velocity near the Section 6 monitoring station was estimated for a reach in Lolo Creek using channel cross-section information provided by USFS (2003b). This relationship is shown in Table 2-4 and Figure 2-3.

2.2 Moose Creek, Independence Creek, and Deadwood Creek

2.2.1 Watershed Description

Moose Creek is a major tributary of lower Kelly Creek located within the upper North Fork Clearwater River drainage (Figure 1-1). Independence Creek and Deadwood Creek are its two major Tributaries. The size of the Moose Creek watershed from its mouth is 66 square miles (USFS 1994). The Independence Creek and Deadwood Creek watersheds are 5.4 and 3.4 square miles, respectively. Both Deadwood Creek and Independence Creek were heavily placer mined in the 1930's and 1940's. Both dredging and hydraulic mining were employed. Moose Creek has been dredged mined above Independence Creek for approximately three miles and from the mouth to approximately two miles above the Deadwood Creek confluence.

Beneficial uses listed for the Clearwater River are domestic water supply, agricultural water supply, cold-water biota, salmonid spawning, primary contact recreation, secondary contact recreation, and special resource waters (Idaho Department of Environmental Quality [IDEQ] 2000). Beneficial uses listed in the Forest Plan for the Moose Creek and Deadwood Creek watersheds are cutthroat

trout (United States Forest Service [USFS] 1987. Cutthroat trout are also known to occur in Independence Creek. Water Quality Limited Segments (WQLS) are streams where the State of Idaho has identified water quality concerns. There are no WQLS listed stream segments within the project area for the EIS.

Deadwood Creek

Past activities in the Deadwood Creek watershed include mining, road building, and timber harvest. Mining was primarily in the floodplain and activities such as dredging and the use of flash dams for hydraulic mining altered channel characteristics, channel stability and substrate composition. An analysis conducted by Clearwater National Forest in 1994 showed that the Deadwood Creek watershed had a light road density of 2.3 miles per square mile (USFS 1994). Many of the roads were built using inslope construction which impacted the natural drainage and sediment delivery of the watershed. Timber harvesting and broadcast burning were conducted from 1968 through 1977 with a total of 600 acres being harvested (29 percent of the watershed).

Independence Creek

Past activities in the Independence Creek watershed include mining, road building, and timber harvest. Mining was primarily in the creek itself and the floodplain adjacent to the creek and its tributaries. Activities such as dredging and the construction of stream diversions altered channel characteristics and channel stability (USFS 1994). USFS (1994) showed that the Moose Creek watershed had a road density of 5.9 miles per square mile. Many of the roads were constructed using inslope construction which impacted the natural drainage and sediment delivery of the watershed. Sediment is delivered to first and second order streams from eroding cutslopes, ditches, and from road surfaces. A diversion that was built to divert water from the East to the West Fork of Independence Creek causes significant erosion from hillslopes cut during construction. Tree harvesting within riparian areas reduced potential large woody debris, decreasing the ability to store and trap sediment. Timber harvesting and broadcast burning were conducted from 1959 and continues until 1982 (USFS 1994). A total of 1,400 acres were harvested.

Moose Creek

Most activities in the Moose Creek watershed were in the Osier, Deadwood and Independence Creek watersheds. However, dredge mining occurred from the mouth to approximately two miles above the Deadwood Creek confluence. The dredge mining greatly impacted the channel, which continues to show the effects. Streambanks remain unstable and a majority of the original channel substrate has been sorted and moved by the dredge activities. USFS (1994) reports that the one major road adjacent to Moose Creek has not disrupted the natural drainage of the watershed. There is a total of 158 miles of road at a density of 2.2 miles per square mile (USFS 1994). Timber harvesting and broadcast burning was also conducted in the Moose Creek watershed between 1959 and 1982 (USFS 1994). A total of 4,853 acres were clearcut (10.4 percent of the watershed).

2.2.2 Climate

Specific climate information for the Deadwood, Independence, and Moose Creek watersheds is not available. However, similar to the Lolo Creek watershed, precipitation would be driven by Aleutian Low and Pacific High maritime air masses (USFS 2003a). Aleutian lows that are prevalent in winter bring periods of heavy precipitation as snow and spring rains. Rain on snow events are common which can cause flooding. The summer climate is driven by predominant Pacific highs causing hot,

dry weather. Average annual precipitation in the Moose Creek watershed is approximately 54 inches per year (USFS 1991).

2.2.3 Geomorphology

Deadwood Creek

The Deadwood Creek watershed is primarily made up of the following land types: glaciated lands, colluvial and frost-churned uplands, and fluvial lands (USFS 1994).

Glaciated lands are characterized by steep, high elevation, rocky peaks and ridges that were shaped by glaciation. Slopes are frequently above 60 percent. Cirque basins are common above 5,500 feet. Streams range from being weakly entrenched in bedrock with moderately steep gradients to gentle, weakly entrenched low gradient streams in valley floors.

Many streams originate in *colluvial and frost-churned uplands* and are located on debris above bedrock with moderately steep gradients. This land group sustains stream flow from ground water throughout the year. Water yields average 60 to 85 percent of precipitation at higher elevations and 40 to 75 percent at lower elevations.

Fluvial lands geomorphologically represent a progression from the higher relief landforms with generally seep gradient streams to lower relief, rolling hill-type topography. Streams in this land type have low gradients and meandering channels are common.

Deadwood Creek has predominantly B3 and B4a channel types as defined by the Rosgen (1994) method (USFS 1994). In general, Type B channels are dominated by riffles with some reaches containing "rapids" and infrequently spaced scour-pools at bends or areas of constriction. The numbers given to the stream types generally describe the material making up the channel substrate such that 1 is bedrock, 2 is boulder, 3 is cobble, 4 is gravel, 5 is sand and 6 is silt/clay (Rosgen 1994). The letter "a" denotes a creek with a gradient above 4 percent. Studies conducted on two reaches within the stream rated Deadwood Creek as having "fair" stability (USFS 1994) and low levels of cobble embeddedness (USFS 1995).

Data are not available describing the particle size distribution of the substrate within Deadwood Creek. However, past activities would suggest that a relatively higher proportion of the substrate could be fine sediments (those by definition that are less than 4 mm in size) as compared to an undisturbed watershed with similar geology. USFS (1994) indicates that Deadwood Creek is an energy limited system, suggesting that sediments produced in the watershed would have a tendency to fall out and collect in the bottom of the channel until high flow events occur. However, the low levels of noted embeddedness, may suggest that fine sediments have been transported out of the stream from large flow events.

Independence Creek

The Independence Creek watershed is dominated by colluvial and frost-churned uplands, and fluvial lands (USFS 1994). The general geomorphologies of these land-types were described for Deadwood Creek above.

Independence Creek has stream reaches with a broad range of types as defined by the Rosgen (1994) system (USFS 2002a). Stream reaches have been surveyed to have the following range of types: A2, A4, A5, A6, B3, B4, B5, G5 and G6, with many reaches denoted with the letter "a" indicating a

stream with a gradient above 4 percent. These stream types are described in Table 2-5. Studies conducted on twenty reaches within the stream rated Independence Creek as having "fair" to "poor" stability (USFS 1994) and moderately high levels of cobble embeddedness (USFS 1995).

Data are available from one cross section describing the particle size distribution of the substrate within Independence Creek (USFS 2003b). Figure 2-4 depicts results from pebble counts showing the percent distribution for several particle size classes. Percent distribution is shown by size class and as an accumulated percentage. These data show a moderately high proportion of the substrate consists of fine sediments in the 0-2 mm size class. These data confirm probable impacts from past activities, such as mining and timber harvests. USFS (1994) further indicates that Deadwood Creek is an energy limited system. This suggests that fine sediments produced in the watershed would have a tendency to fall out and collect in the bottom of the channel until high flow events occur. Studies conducted on two reaches within the stream rated Independence Creek as having "fair" stability (USFS 1994) and low levels of cobble embeddedness (USFS 1995).

<u>Moose Creek</u>

The Moose Creek watershed is dominated by glaciated lands, colluvial and frost-churned uplands, and fluvial lands (USFS 1994). The general geomorphologies of these land-types were described for Deadwood Creek above.

Two stream reaches surveyed by Clearwater National Forest both show Moose Creek with a B3 channel type as defined by the Rosgen (1994) system (USFS 1994). Type B channels are dominated by riffles with some reaches containing "rapids" and infrequently spaced scour-pools at bends or areas of constriction. The number 2 denotes a substrate that is predominately composed of boulders. Studies conducted on these two reaches within the stream rated Moose Creek as having "fair" stability (USFS 1994) and low levels of cobble embeddedness (USFS 1995).

Data are available from two reaches describing the particle size distribution of the substrate in Moose Creek (USFS 2003b). These reaches were surveyed using the Wolman pebble count method (Wolman, 1954). One surveyed reach was on Moose Creek near the mouth and one reach was surveyed above the Independence Creek confluence. Figure 2-5 depicts results from pebble counts showing the percent distribution for several particle size classes. Percent distribution is shown by size class and as an accumulated percentage. These data show a moderately high proportion of the substrate consists of fine sediments in the 0-2 mm size class. These data confirm probable impacts from past activities, such as mining and timber harvests. However, USFS (1994) indicates that Moose Creek is an energy surplus system. This suggests that fine sediments produced in the watershed would have a tendency to be transported out of the watershed. An energy surplus stream also has the potential to impact channel morphology through scouring of the bed and erosion of the banks during very high flows.

2.2.4 Stream and Sediment Discharge

Clearwater National Forest applied a flow-sediment yield model (WATBAL) to evaluate sediment yields and hydrologic response of the Moose Creek watershed including the Deadwood Creek and Independence Creek tributaries (USFS 1994). The WATBAL model is designed to simulate the potential and most likely effects of forest management practices, such as timber harvest, road construction, or fire on watershed hydrology and sediment yield.

Deadwood Creek

Based on WATBAL, sediments produced in the Deadwood Creek watershed from logging and road construction tend to deposit in the channel. Natural sediment production was estimated at 18 tons per mile per year (USFS 1994). This would be considered the average rate of erosion and sediment transport through an undisturbed natural system. The sediment yield from the watershed was percent over "natural" in 1994 and 5 percent over natural projected for 2003

The Forest Plan standard for Deadwood Creek is a B channel type, cutthroat high fishable stream (USFS 1987). The approximate maximum sediment loadings that generally support this criterion are 55 percent over "natural". Nine percent is below the Forest Plan standard that must be met for sediment production 10 out of 30 years. Sediment production should be at or below 35 percent over natural for 20 out of 30 years. Based on this analysis, Deadwood Creek is currently meeting goals established by the Forest Plan.

In 1994, Equivalent Clearcut Acres (ECA) was 5.3 percent in the Deadwood Creek watershed. WATBAL showed a peak flow increase of 4 percent over natural for 1994 (USFS 1994) and 3 percent over natural for 2003. This is less than the level of 15 to 20 percent that is considered to be potentially detrimental to the stream system (USFS 1994).

Stream discharge, suspended sediment, turbidity, and bedload were studied on Deadwood Creek in 1981 (USFS 1993b). Table 2-6 provides average monthly data. Bedload is a measurement of sediment and larger size particles that move by saltation (i.e. jumping rolling, or sliding along the stream bottom. Bedload can be added to the suspended load to determine the total sediment load for a stream. These limited data show relatively a moderately high levels of total sediment load in June (1,031 lbs/day) and July (1045 lbs/day) and low levels in August (9.6 lbs/day). Turbidity levels ranged between 0.7 and 1.9 Nephelometric Turbidity Units (NTU) which is well under the State turbidity standard of 50 NTU. Turbidity data show that sediment production in Lolo Creek is meeting State water quality standards. These 1981 data represent a worse-case scenario for Deadwood Creek as stream discharge was at its highest above "natural" according to the WATBAL model (USFS 1994). Relationships between mean monthly stream discharge and sediment load are depicted in Figure 2-6.

Independence Creek

Based on WATBAL, sediments produced in the Independence Creek watershed from logging and road construction tend to deposit in the channel, and surveys conducted noted high amounts of fine sediments in the channel (USFS 1994). Natural sediment production was estimated at 17 tons per square mile per year (USFS 1994). This would be considered the average rate of erosion and sediment transport through an undisturbed "natural" system. The sediment yield from the watershed was 33 percent over "natural" in 2003. USFS (1994) reports that the 33 percent value was a large reduction in the amount of sediment yields that WATBAL estimated for the 1960s and 1970s, thus concluding that impacts associated with road construction and timber harvesting had mostly subsided.

The Forest Plan standard for Independence Creek is a B channel type, cutthroat moderate fishable stream (USFS 1987). The approximate maximum sediment loadings that generally support this criterion are 150 percent over natural. The 43 percent level is well below the Forest Plan standard that must be met for sediment production 10 out of 30 years. Based on this analysis, Independence Creek is currently meeting goals established by the Forest Plan.

The Equivalent Clearcut Acres (ECA) was 19.1 percent in the Independence Creek watershed in 1994. WATBAL showed a peak flow increase of 8 percent over natural for 1994. This is less than the level of 15 to 20 percent that is considered to be potentially detrimental to the stream system.

Stream discharge, suspended sediment, turbidity, and bedload were studied on Independence Creek in 1981. Average monthly data are provided in Table 2-7. These limited data show relatively high levels of total sediment load in June (1,441 lbs/day) and July (667 lbs/day) and low levels in August (27 lbs/day). Turbidity levels range between 1.1 and 5.2 NTU and are well under the State turbidity standard of 50 NTU above background. Turbidity data show that sediment production in Lolo Creek is meeting State water quality standards. These 1981 data represent a worse-case scenario for Independence Creek as stream discharge was at its highest above "natural" according to the WATBAL model (USFS 1994). Relationships between mean monthly stream discharge and sediment load are depicted in Figure 2-7.

Moose Creek

Based on WATBAL, sediments produced in the Moose Creek watershed from logging and road construction tend to be transported out of the watershed because of a relatively high energy system (USFS 1994a). Natural sediment production was estimated at 12 tons per square mile per year (USFS 1991). This would be considered the average rate of erosion and sediment transport through an undisturbed "natural" system. The sediment yield from the watershed was projected to be 0 percent over "natural" in 2003. USFS (1994a) reports that this is a large reduction in the amount of sediment yields that WATBAL estimated for the 1960s.

The Forest Plan standard for Moose Creek above the Independence Creek confluence is a B channel type, cutthroat high fishable stream (USFS 1987). The approximate maximum sediment loadings that generally support this criterion are 55 percent over "natural". The 2003 level of 0 percent is well below the Forest Plan standard that must be met for sediment production 10 out of 30 years.

In 2003, Equivalent Clearcut Acres (ECA) amounted to 4.8 percent in the Moose Creek watershed. WATBAL showed a peak flow increase of 3 percent over natural for 2003. This is less than the level of 15 to 20 percent that is considered to be potentially detrimental to the stream system (USFS 1991).

Stream discharge, suspended sediment, turbidity, and bedload were monitored on Moose Creek between 1979 and 1981. Average monthly values are presented in Table 2-8. These data show relatively low levels of suspended and total sediment load for most months. Turbidity levels range between 0.7 and 4.3 NTU and are well under the State turbidity standard of 50 NTU above background. Turbidity data show that sediment production in Lolo Creek is meeting State water quality standards. Relationships between mean monthly stream discharge and sediment load are depicted in Figure 2-8.

The relationship between stream discharge and sediment transport, depicted in Figure 2-8, is related to stream velocity. There are several factors, such as channel width, depth and slope that determine the velocity of a stream at any given flow rate and at any given point. However, the velocity of the water flowing in a stream generally increases with increasing stream flow. Increasing higher velocities are required to entrain (i.e. dislodge) suspend and transport increasingly larger sizes of sediment material. As flow velocity decreases, sediment particles settle out according to size. At low velocities the stream only has enough energy to keep very fine sediments (i.e. silts and clays) suspended. Sand and larger fractions drop out to the channel substrate.

A relationship between stream discharge and stream velocity near the Section 6 monitoring station were estimated for a reach in Lolo Creek using channel cross-section information provided by USFS (2003b). This relationship is shown in Table 2-9 and Figure 2-9.

3.0 ENVIRONMENTAL CONSEQUENCES

3.1 Description of Alternatives

This section summarizes the alternatives selected for detailed consideration.

3.1.1 Alternative 1: No Action Alternative

The "no action" alternative is required by regulation in 40 CFR 1502.14(d). It is used, in part, to measure action alternatives to determine the effects of not implementing an action alternative. For purposes of this EIS, the No Action Alternative is defined as not approving proposed plans of Plans of Operations. Under this alternative, miners who submit Plans of Operations for suction dredging in Lolo Creek and Moose Creek would not receive approval for their plans of operations. No suction dredging would be allowed under the mining law or under any other authorization. This alternative could not be implemented under current law, including the Mining law of 1872, and violates Forest Service regulations at 36 CFR 228A. However, this alternative provides a comparable environmental baseline against which to evaluate effects of the action alternatives. This is consistent with and legal under NEPA, which allows for analysis of alternatives that are not allowed under current law or regulations but that are valuable for exploring the range of effects.

3.1.2 Alternative 2: Proposed Action

The Clearwater National Forest proposes to approve, with no further NEPA analysis, proposed Plans of Operation in specified reaches of Lolo Creek (including a tributary, Dutchman Creek) and Moose Creek (including two tributaries, Independence Creek and Deadwood Creek) if the operator agrees to specified operating conditions and mitigation measures as described below. The maximum number of operations approved in any year under this analysis will be 18 for Lolo Creek and 38 for Moose Creek. These numbers correspond with the maximums listed in the USFWS and NOAA Fisheries Biological Opinions (USFWS 2003 and NOAA Fisheries 2003). Proposed operations exceeding the maximums will require reinitiating consultation with USFWS and NOAA Fisheries and separate NEPA analysis.

The terms and conditions (T&C) with which proposed plans of operations have to comply in order to qualify for approval under the proposed action are listed below:

1. Operations may occur only below the ordinary high water line during a dredge season extending from July 1 through August 15.
2. The suction dredge may have a nozzle diameter of 5 inches or less and with a horsepower rating of 15 horsepower or less.
3. Dredge sites must be located in areas of large substrate not preferred for spawning steelhead trout and bull trout.
4. If streambanks are disturbed in any way, they must be restored to the original contour and revegetated.
5. Prior to dredging, operators must meet with a Forest Service fisheries biologist who will inspect the proposed dredge sites. No dredging will be allowed in areas of known bull trout (or steelhead, in the case of Lolo Creek) spawning or in areas identified as spawning habitat.

6. Operators may not move cobbles in the stream course to the extent that the deepest and fastest portion of the stream channel (the thalweg) is altered or moved.
7. Operators must cease activities during wet periods when project activities are causing excessive ground disturbance or excessive damage to roads.
8. All human waste must be kept more than 200 feet away from any live water. All refuse from dredging activities must be packed out and disposed of properly.
9. Mechanized equipment must be operated below the mean high water mark except for the dredge itself and any life support system necessary to operate the dredge. No mechanized equipment other than the suction dredge may be used for conducting operations.
10. Dredging must be conducted in a manner so as to prevent the undercutting and destabilization of stream banks, and may not otherwise disturb streambanks.
11. Dredging may not dam the stream channel.
12. Operators must maintain a minimum spacing of at least 100 linear feet of stream channel between suction dredging operations.
13. Dredges may not operate in the gravel bar areas at the tails of pools.
14. Dredges may not operate in such a way that fine sediment from the dredge discharge blankets gravel bars.
15. Operators must visually monitor the stream for 300 feet downstream of the dredging operation after the first half hour of continuous operation. If noticeable turbidity is observed downstream, the operation must cease immediately or decrease in intensity until no increase in turbidity is observed 300 feet downstream.
16. Dredges must not operate in such a way that the current or the discharge from the sluice is directed into the bank in a way that causes erosion or destruction of the natural form of the channel, that undercuts the bank, or that widens the channel.
17. Operators may not undermine, excavate, or remove any woody debris or rocks that extend from the bank into the channel.
18. Operators may not remove, relocate, or disturb in-stream woody debris or boulders greater than 12 inches in diameter.
19. Gasoline and other petroleum products must be stored in spill-proof containers at a location that minimizes the opportunity for accidental spillage.
20. The suction dredge must be checked for leaks, and all leaks repaired, prior to the start of operation. The fuel container used for refueling must contain less fuel than the amount needed to fill the tank. The suction dredge must be on stilts or anchored to the stream bank when refueling while afloat, so that the distance over which fuel must be carried over water is minimized. Unless the dredge has a detachable fuel tank, operators may transfer no more than one (1) gallon of fuel at a time during refilling. Operators must use a funnel while pouring, and place an absorbent material under the tank while refueling to catch any spillage. A spill kit must be available in case of accidental spills. If soil is contaminated by spilled petroleum products, the soil must be excavated to the depth of saturation and removed from the National Forest for proper disposal.

21. All dredge piles must be broken down and all dredge holes must be backfilled by the end of the operating season, no later than August 15.

22. Dredging operations must be shut down immediately if fish eggs are excavated, if sick, dead, or injured steelhead or bull trout are observed, or if destruction of redds is observed. Operators must contact the Clearwater National Forest and receive authorization to proceed prior to resuming operations. Operators must record the date, time, location, and possible cause of fish injury or death. Also, operators must notify the Forest if any emergency or unanticipated situation arises that may be detrimental to bull trout relative to suction dredging.

23. Camping areas, paths, and other disturbed sites that are located along stream banks and that are associated with dredge operations must be revegetated or otherwise restored to their original conditions at the end of the dredge season.

24. Dredging operations must be shut down immediately if the operator observes bull trout in either creek or steelhead in Lolo Creek. The operation must remain shut down until the fish move out of the area, to a point at least 100 feet upstream of the operation or at least 500 feet downstream.

25. Operators must obtain and comply with all required permits, including the Idaho State Permit to Alter a Stream Channel, and comply with all required conservation measures and Best Management Practices.

26. Intakes must be screened with 2/32 mesh.

27. Dredging operations must take place during daylight hours.

28. Shallow areas must be restored to their original grade each day and natural pools may not be filled. Tailings must be redistributed to avoid creating unstable spawning gravels.

29. If operators encounter mercury in dredged material, it may not be returned to the active stream channel or disposed of on Forest Service lands. Operators must cease operations and notify the Forest if more than two droplets of mercury are discovered during the dredging process. Operators may not use mercury, cyanide, or any other hazardous or refined substance to recover or concentrate gold.

30. At the end of the operating season, no later than September 15, the operator must provide Clearwater National Forest a description of the actual location(s) of the operation, the surface areas dredged, and the number of days operated.

Other components of the proposed action, which also are based on terms and conditions required to implement the reasonable and prudent measures in the Biological Opinions, involve monitoring by the Forest Service and reporting to USFWS and NOAA Fisheries. Specific monitoring and reporting that will be implemented by the Forest Service include the following:

1. Monitor active operations and the impact of mining on fish habitat in each creek at least five times during the mining season.

2. Monitor changes in stream morphology as a result of mining through specific measures specified in the Biological Opinion.

3. Upon notice by an operator under item 22 above of dead, injured, or sick bull trout, or of the destruction of redds, notify USFWS Division of Law Enforcement and the Snake River Basin office within 24 hours.

4. Upon notice by an operator under item 22 above of dead or injured steelhead, or if eggs are excavated, notify NOAA Fisheries Law Enforcement Office in the Vancouver Field Office, and the Grangeville Field Office, prior to authorizing a resumption of dredging.
5. Inspect dredged areas after all dredging activities have been completed for the season.
6. Provide written report or letter to USFWS, within 90 days of the end of each dredging season, indicating the actual number of bull trout taken, if any, and any relevant biological/habitat data or other pertinent information on bull trout that was collected.
7. Provide annual monitoring report, by November 30, to NOAA Fisheries that describes operator compliance with suction dredging rules, the amount of stream area mined at each site, a photo of the mined area, and details about streambank disturbance and revegetation, if any.
8. Provide NOAA Fisheries an update of pre-season monitoring no later than June 15, and a report on post-season monitoring progress no later than September 15.

Under this proposed action, a claimant or operator would submit to the District Ranger a proposed Plan of Operations that included all of the criteria above. The plan would provide site-specific information sufficient for the District Ranger to determine that the terms and conditions of the proposed action are adequate for protection of surface resources on that specific site.

If the District Ranger determines that the proposed plan of operations meets the conditions described above and they are sufficient to protect surface resources on that site, the plan of operations could be approved with no further NEPA analysis.

Plan approval would be in effect for the duration of the operating season, as long as the operation is conducted within the terms and conditions. A new plan of operations would have to be submitted and approved for each operation before each mining season.

3.1.3 Alternative 3: Additional Mitigation Measures

This alternative is the same as alternative 2, except that it includes two specific mitigation projects.

The first project involves bank stabilization and reclamation of the abandoned Lolo #5 mining claim on Lolo Creek. Lolo #5 was placer mined by draglines and large dredges through at least the 1950s, and the site was never reclaimed. The mining also caused Lolo Creek to be rerouted from its original floodplain and channel. Stockpiled overburden and bermed placer tailings along the creek have remained unstable and continue to be a major contributor of fine sediment to the stream system. Studies conducted by the Clearwater National Forest in 1998 showed unstable stream banks had increased from 56 to 418 meters per kilometer since being surveyed in 1993 (USFS 2002a). The mitigation project would stabilize and reclaim Lolo Creek, and would include the following components.

- Regrade and reclaim existing placer tailings away from the current channel to provide stable non-erodable slopes and to blend the local landscape into existing topography.
- Regrade and reclaim existing placer tailings away from existing emergent wetlands that have formed in parts of the old channel and prevent erosion of materials into these wetlands.
- Rehabilitate and restore the existing creek to provide stable banks and a new channel that is geomorphologically and hydraulically stable and provides suitable aquatic habitat, and

provides riparian vegetation along stream banks. This may include rerouting the channel to provide increased meandering, lower the existing gradient and regrading to provide a functional floodplain.

The second project would involve installation of a drainage device or ford with concrete planking where there is now a ford where Forest Road 5440 crosses Independence Creek. Road 5440 is a native surfaced local Forest road used to access the mining claims along Moose and Independence Creeks. The present Independence Creek crossing is a ford that is a potential fish barrier and also a source of sediment to downstream Independence Creek and Moose Creek.

3.2 Environmental Consequences Associated with Each Alternative

This section discusses potential impacts to hydrology, channel morphology and water quality for each alternative.

3.2.1 Hydrology and Stream Discharge

Alternative 1: No Action

Hydrologic conditions, such as water yield, peak runoff and annual sediment yield within any watershed are a function of land use activities and management. Land use activities and management goals are specified within the guidelines of the Forest Plan (USFS 1987) and would not change as a result of any alternative. These conditions would remain the same under the No Action alternative as well as for all alternatives. Not approving small-scale suction dredging would not affect stream flow or annual sediment yield within the Lolo Creek or Moose Creek watersheds.

Alternative 2: Proposed Action

Hydrologic conditions, such as water yield, peak runoff and annual sediment yield within any watershed are a function of land use activities and management. Watershed conditions and management would remain same under the Proposed Action alternative as well as for all alternatives. Allowing approval of small-scale suction dredging plan of operations would not affect the amount of stream flow, water yield or annual sediment yield produced in the Lolo Creek or Moose Creek watersheds.

Alternative 3: Additional Mitigation Measures.

Potential impacts associated with small-scale suction dredging would be the same as those discussed for Alternative 2.

3.2.2 Stream Geomorphology

Alternative 1: No Action

Channel geomorphologic conditions would be expected to be unchanged under the No Action alternative. Not approving small-scale suction dredging would decrease the likelihood of impacts to the channel substrate or channel condition. However, minor impacts to channel banks, and channel conditions that result from other small-scale uses such as fishing, camping, wading, or swimming would still occur.

The terms and conditions (i.e. mitigation measures) for the proposed action stipulate that the creek can not be dammed, large woody debris and large boulders can not be moved, tailings can not be

piled on banks or in a manner that stream flow is directed into a bank, and that all displaced substrate materials be replaced after dredging activities. Although these conditions would prevent any significant impacts to the stream channel, potential impacts from these activities would be completely negated under the No Action alternative

Bank stabilization and reclamation proposed for the abandoned Lolo #5 mining claim on Lolo Creek would not be conducted under the No Action alternative. Unstable banks in the area would remain the same providing an exposed source of sediments to the creek. The channel in the area of the claim would remain channelized which can result in increased channel scour both upstream and downstream of the site. These impacts can propagate over time, affecting additional lengths of the channel each year.

Installation of a drainage device or ford with concrete planking at the Forest Road 5440 crossing on Independence Creek would not be conducted under the No Action alternative. The present road crossing is a ford that is a potential fish barrier and also a source of sediment to downstream Independence Creek and Moose Creek caused by localized scouring of the channel. Improperly designed or unstable road crossings can locally affect stream channel morphology. These effects cause erosion of the channel bottom or channel banks. In time, changes to channel morphology can be propagated both up and downstream until the stream comes back into equilibrium.

Alternative 2: Proposed Action

In-stream structures, such as large boulders and large woody debris, provide local stability to a channel. These structures control stream gradient, flow direction, or produce localized pools or cover for fish. Removal of large boulders or other large structures can locally affect the energy and direction of stream flow and cause the channel to change over the long term by eroding the channel bottom or channel banks. In time, these changes can be propagated both up and downstream until the stream comes back into equilibrium. The terms and conditions (i.e. mitigation measures) for the proposed action stipulate that the creek can not be dammed, large woody debris and large boulders can not be moved and tailings can not be piled on banks or in a manner that stream flow is directed into a bank. Long-term impacts to channel morphology would not be expected if large structures are not moved in the channel.

Suction dredging typically leaves one or several cone shaped holes in the streambed with the excavated material in a pile downstream. A single hole typically removes 1 to 2 cubic yards of material. Small-scale suction dredging would cause impacts to localized areas of the channel bottom by moving substrate materials and some redirection of stream flow could result from moving and piling bottom materials downstream of the hole. While dredging activities would cause a temporary disruption of channel substrate materials, the terms and conditions state that all displaced substrate materials be replaced after dredging activities are completed. In addition, the stipulations require that the Forest Service monitor all active sites at least five times during the mining season to monitor potential changes in morphology. The Forest Service is also required to inspect all channel reclamation after dredging activities have concluded. If these stipulations are followed, impacts would be temporary and not result in alteration of the channel morphology or stream equilibrium.

The bank stabilization and reclamation proposed for the abandoned Lolo #5 mining claim on Lolo Creek and the installation of a drainage device or ford with concrete planking at the Forest Road 5440 crossing on Independence Creek would not be conducted under the Proposed Action alternative. Long term impacts would be the same as those discussed for the No Action alternative.

Alternative 3: Additional Mitigation Measures.

The bank stabilization and reclamation proposed for the abandoned Lolo #5 mining claim on Lolo Creek and the installation of a drainage device or ford with concrete planking at the Forest Road 5440 crossing on Independence Creek would be conducted under this alternative.

The bank stabilization activities would directly reduce bank erosion, which alters the stream channel morphology and sedimentation of the creek. Restoration of the stream channel to match expected stream gradients, natural pool-riffle ratios and channel sinuosity would mitigate impacts associated with increased stream flow velocities and channel erosion that are associated with the current channelized condition.

Installation of a properly design and stable ford or drainage culvert system at the Forest Road 5440 crossing on Independence Creek would reduce or eliminate the current channel erosion and sedimentation that is associated with the current crossing.

3.2.3 Water Quality

Alternative 1: No Action

Any potential impacts that could be associated with the accidental spills or discharge of wastes or chemicals to the stream from suction dredging activities would be completely negated under the No Action Alternative. Accidental spills of chemicals or wastes near or in streams could still potentially occur from activities associated with other uses of the area.

The terms and conditions (i.e. mitigation measures) for the proposed action are designed to prevent or minimize the contamination of the creek from the spill of chemicals, wastes or other agents. Although these conditions would prevent any significant impacts to the stream channel, accidental spills associated with these activities would be completely negated under the No Action alternative.

Fine sediment and turbidity levels in Lolo, Deadwood, Independence and Moose Creeks would be expected to remain low under the No Action alternative. The local sediment delivery to the stream channels would be unchanged. Dredging sites are usually located near established campgrounds with their associated pullouts or access roads and additional road construction would not be conducted or allowed under the proposed alternative. Therefore, fine sediment and ground disturbance associated with camping activities and vehicular traffic due to suction dredging activities would not be expected to be significantly reduced over those associated with recreational activities such as fishing, hunting, hiking and camping.

Regrading and stabilization of the tailing materials and disturbed areas at the Lolo #5 mining claim would not be conducted under the No Action alternative. Exposed sediment sources from pile dredge tailings and overburden materials would remain and provide localized delivery of sediments to Lolo Creek. Erosion of unstable stream banks would continue to be a source of sediment to the creek.

Installation of a drainage device or ford with concrete planking at the Forest Road 5440 crossing on Independence Creek would not be conducted under the No Action alternative. The present road crossing is a ford that is a potential fish barrier and is also a source of sediment to downstream Independence Creek and Moose Creek. Localized scouring of the channel and the resulting increases in sediment and turbidity would remain unchanged.

Alternative 2: Proposed Action

Potential impacts to water quality could result from the spillage of chemicals or wastes near or in the streams. Fuel used to power a suction dredge is considered a hazardous material in a stream. The terms and conditions (i.e. mitigation measures) for the proposed action are designed to prevent or minimize the contamination of the creek from the spill of chemicals, wastes or other agents. The terms and conditions (i.e., mitigation measures) under the Proposed Action alternative stipulate:

- All refuse from dredging activities must be packed out and disposed of properly.
- All human waste must be kept more than 200 feet away from any live water.
- Operators may not use mercury, cyanide, or any other hazardous or refined substance to recover or concentrate gold.
- If operators encounter mercury[2] in dredged material, it may not be returned to the active stream channel or disposed of on Forest Service lands. Operators must cease operations and notify the Forest if more than two droplets of mercury are discovered during the dredging process.
- The suction dredge must be checked for leaks, and all leaks repaired, prior to the start of operation.
- The fuel container used for refueling must contain less fuel than the amount needed to fill the tank.
- The suction dredge must be on stilts or anchored to the stream bank when refueling while afloat, so that the distance over which fuel must be carried over water is minimized.
- Unless the dredge has a detachable fuel tank, operators may transfer no more than one (1) gallon of fuel at a time during refilling.
- Operators must use a funnel while pouring, and place an absorbent material under the tank while refueling to catch any spillage.
- A spill kit must be available in case of accidental spills. If soil is contaminated by spilled petroleum products, the soil must be excavated to the depth of saturation and removed from the National Forest for proper disposal.

Impacts from potential spills that would result from dredging activities would be considered minor if operators follow the stipulations, which include requirements for the Forest Service to monitor all operations five times during the mining season. Impacts would be similar to those that would be expected from recreational activities such as boating in a reservoir or pond or the operation of off road vehicles.

Suction dredging occurs in the confines of the stream channel and does not result in the discharge of any new sediment to the creek. The suction dredge pulls stream sediment, gravel and small rocks,

[2] Mercury is potentially present because of its possible use in past mining activities to recover gold.

and other materials (collectively, the "overburden") from the stream bottom, along with any gold. All this material is routed through a sluice box. The sluice box channels the water and other material over a series of riffles that serve to create pockets of slow water immediately behind each riffle -- the heavier material, including any gold, settles behind the riffles and the rest goes directly back into the stream.

Dredging can entrain (i.e. release) fine sediments from the stream bed material and locally increase turbidity in the stream. Turbidity results from an increase of suspended fine sediment that reduces water clarity. The State of Idaho standard states that background turbidity levels can not be increased by more than 50 NTU instantaneously or 25 NTU for more than 10 days (IDEQ 2000). The degree that turbidity is increased by dredging is highly variable and is dependent on the amount of very fine sediments (i.e. silts and clays) that occur in the bed material and the velocity of the stream flow. As discussed in Section 2.1.4, the size and amount of sediment that can be carried by a stream is related to the stream flow velocity.

Figure 2-1 shows that a very small fraction of the sampled bed material in Lolo Creek are fine materials (<0.25 mm). Stream flow velocities during the permissible operating season in July and August are also low with values of 1.29 and 0.93 fps, respectively (Table 2-4). At these levels, it is unlikely that detectable or significant increases in turbidity above the 50 NTU limit would occur during suction dredge operations in Lolo Creek. Any increases in turbidity would be for a short duration while the dredge is operating and any fine sediments that are released would drop out downstream in an area where stream velocities are greatly slowed, such as a pool. These impacts would not be considered significant compared to the background total sediment loads of 1,541 and 500 pounds per day in July and August, respectively (Table 2-3).

Figures 2-4 and 2-5 show particle size distributions for Independence and Moose Creeks. These data suggest that a larger fraction of fine materials may exist in these creek substrates than those found in Lolo Creek, although data is not available for very small size fractions that would include silt and clay material. Observed stream velocities in these creeks are also low during July and August (Table 2-9). Data is not available for Deadwood Creek but particle size distribution of the creek substrate would be expected to be similar because of similar historic watershed activities and impacts.

These data suggest that it is more likely that detectable increases in turbidity would occur during suction dredge operations in these creeks than in Lolo Creek. However, low observed background turbidity levels (Tables 2-7 through 2-9) would suggest that levels of very fine sediment that could potentially impact turbidity are low.

Significant increases in turbidity, potentially above the 50 NTU standard, would be expected if dredging activities extend into channel banks. Stream banks would be a readable source of fine sands, silts, and clays. These impacts will be mitigated by stipulations stating that dredges must not be operated in such a way that causes erosion or destruction of the natural form of the channel, that undercuts the bank, or that widens the channel. Impacts from dredging into banks would not be expected if these terms and conditions are followed.

Terms and conditions have been established to mitigate potential increases in turbidity and release of fine sediments down stream should they occur. These stipulations state that operators must visually monitor the stream for 300 feet downstream of the dredging operation after the first half hour of continuous operation. If noticeable turbidity is observed downstream the operation must cease immediately or decrease in intensity until no increase in turbidity is observed 300 feet downstream.

Alternative 3: Additional Mitigation Measures

Impacts to water quality that would result from suction dredging activities would be the same as those discussed for Alternative 2.

Regrading and stabilization of the tailing materials and disturbed areas at the Lolo #5 mining claim would be conducted under Alternative 3. Exposed sediment sources from piled dredge tailings and overburden materials would be regraded and reclaimed to prevent future erosion and the delivery of sediments to Lolo Creek. Restoration of the stream would stabilize exposed stream banks and mitigate further sedimentation and increases in turbidity from this area.

Installation of a drainage device or ford with concrete planking at the Forest Road 5440 crossing on Independence Creek would stabilize the channel and mitigate the increases in sediment and turbidity that result from and around this structure.

TABLES

Table 2-1. Comparison of Channel Characteristics Collected During Surveys in 1993 and 1998 for Mainstem Lolo Creek.

Reach [2]	Channel Type	Channel Stability[1] 1998	Bank Stability 1993	Bank Stability 1998	Cobble Embeddedness % 1993	Cobble Embeddedness % 1998
LO-13	B3	69	4.9	5.0	47	46
LO-14	B3	66	5.0	5.0	47	41
LO-15	B3	72	5.0	4.8	36	35
LO-16	B3	85	4.8	4.7	50	51
LO-17	B3	86	5.0	4.8	51	48
LO-18	C3	101	4.3	4.9	56	62
LO-19	B2	60	5.0	5.0	27	35
LO-20	C3	96	4.8	4.4	44	46
LO-21	B3c	76	5.0	4.9	51	42
LO-22	B3c	76	5.0	5.0	46	45
LO-23	B3c	83	5.0	5.0	58	52
LO-24	C3	93	4.8	4.8	57	54
LO-25	B3c	58	4.7	4.9	40	37
LO-26	C3	86	5.0	4.5	59	55
LO-27	B3	55	5.0	5.0	42	40
LO-28	C3	88	4.8	4.7	54	50
LO-29	B2c	66	5.0	4.9	52	46
LO-30	B3c	97	5.0	4.5	55	56
LO-31	B2c	74	5.0	5.0	46	45
LO-32	B3c	100	4.9	4.7	49	52
LO-33	B3	55	5.0	5.0	48	45
LO-34	C3	101	4.3	2.9	39	48
LO-35	B1c	62	4.7	4.3	34	36
LO-36	C3	90	5.0	4.0	53	55
LO-37	B3c	78	4.4	4.7	36	41
LO-38	C3	93	4.7	4.2	76	56
LO-39	C3	70	4.8	4.6	26	38
LO-40	C3	81	4.8	4.3	18	43
LO-41	B3c	67	4.9	5.0	28	34
LO-42	B2c	59	5.0	5.0	44	46
LO-43	A2	56	5.0	5.0	7	12
LO-44	B2	56	5.0	5.0	13	25
LO-45	A2	52	5.0	5.0	7	12
LO-46	B3c	61	5.0	5.0	14	24
LO-47	C3	65	5.0	5.0	45	39
LO-48	C3	57	5.0	4.7	35	34
LO-49	C3	68	4.9	4.8	30	28
Mean		77.1 (Fair)	4.9 (Stable)	4.7 (Stable)	44.7% (DFC 30-35%)	42.8% (DFC 30-35%)

Table adapted from (USFS 2002a); a map of the specific reach locations is not available.
[1] <39 = Excellent; 39-76 = Good; 77-114 = Fair; >114 = Poor.
[2] a map of reach locations is not available
c depicts a channel with a slope that is less than 2%.

Table 2-2. Annual Mean and Maximum Stream Discharge, Suspended Sediment, and Turbidity Measured at the Lolo Creek Section 6 Bridge.

Year	Mean Discharge cfs	Maximum Discharge cfs	Mean Suspended Sediment mg/l	Maximum Suspended Sediment mg/l	Mean Turbidity NTU	Maximum Turbidity NTU
1986	95.9	448	10.7	50.7	1.6	5.3
1987	121	1,040	21.7	199	3.5	18.0
1988	57.7	360	5.9	40	2.2	4.5
1989	82.3	570	7.6	48		
1990	77.2	332	8.4	95	1.6	9.0
1991	107	446	12.4	66		
1992	57.9	262	16.8	145		
1993	84.4	409	11.7	72		
1994	57.9	343	12.7	59		
1995	84.0	387	11.3	64		
1996	152	1,209	9.7	60		
1997	135	854	13.2	183		
1998	46.4	120	17.8	185	3.0	24.8
1999	108	543	9.4	47	3.0	12.1
2000	91.9	409	9.1	95	2.3	11.1
2001	75.3	365	6.1	76	1.9	18.8

Table adapted from (USFS 2002a).
cfs = cubic feet per second.
mg/l = milligrams per liter
NTU = Nephelometric Turbidity Units

Table 2-3. Average Monthly Discharge, Suspended Sediment Load, Bedload, and Total Sediment Load Measured at the Lolo Creek Section 6 Bridge.

Month	Average Stream flow Cfs	Average Suspended Sediment Conc. mg/L	Average Suspended Sediment Load lbs/day	Average Bedload lbs/day	Total Sediment Load lbs/day
Oct	32	10	859	NA	
Nov	49	25	3,317	388	3,704
Dec	49	NA	NA	NA	
Jan	51	NA	NA	NA	
Feb	88	15	3,511	NA	
Mar	140	12	4,399	212	4,611
April	244	14	9,113	2,552	11,665
May	242	15	9,459	2,918	12,378
June	138	15	5,372	1,288	6,660
July	55	10	1,541	239	1,780
Aug	25	7	500	458	957
Sept	21	8	455	721	1,175

Table adapted from USFS (2003b)
cfs = cubic feet per second.
mg/l = milligrams per liter
lbs/day = pounds per day
NTU = Nephelometric Turbidity Units

Table 2-4. Relationship between Stream Flow And Stream Velocity at the Lolo Creek Section 6 Bridge.

Month	Average Stream Discharge cfs	Average Flow Velocity Flow Velocity Fps
Oct	17	1.00
Nov	28	1.21
Dec	29	1.23
Jan	29	1.23
Feb	51	1.53
Mar	83	1.83
Apr	143	2.24
May	142	2.24
Jun	79	1.80
Jul	32	1.28
Aug	14	0.93
Sep	12	0.88

Table adapted from USFS (2003b)
cfs = cubic feet per second
fps = feet per second.

Table 2-5. Channel Descriptions by Channel Type

Rosgen Channel Type	Channel Description
A2	Entrenched, steep stream with a boulder substrate
A4	Entrenched, steep stream with a cobble substrate
A5	Entrenched, steep stream with a sand substrate
A6	Entrenched, steep stream with a silt/clay substrate
B3	Moderately entrenched stream with a boulder substrate
B4	Moderately entrenched stream with a cobble substrate
B5	Moderately entrenched stream with a cobble substrate
G5	Entrenched (Gullied) stream with a sand substrate
G6	Entrenched (Gullied) stream with a silt/clay substrate

Source: USFS (1994)

Table 2-6. Mean Stream Discharge, Suspended Sediment, Bedload, and Turbidity measured on Deadwood Creek in 1981.

Month	Mean Discharge (cfs)	Mean Suspended Sediment Conc. mg/l	Mean Suspended Sediment Load lbs/day	Mean Bedload lbs/day	Total Sediment Load lbs/day	Turbidity NTU
Oct	2.2	0.3	3	12	15	1.9
Nov	NA	NA	NA	NA	NA	NA
Dec	NA	NA	NA	NA	NA	NA
Jan	NA	NA	NA	NA	NA	NA
Feb	NA	NA	NA	NA	NA	NA
Mar	NA	NA	NA	NA	NA	NA
Apr	NA	NA	NA	NA	NA	NA
May	13.5	4.0	289	195	484	0.7
Jun	19.2	4.8	466	565	1,031	1.2
Jul	6.9	5.2	153	892	1,045	1.2
Aug	2.3	1.8	22	0	22	0.7
Sep	NA	NA	NA	NA	NA	NA

Table adapted from USFS (2003b)
cfs = cubic feet per second.
mg/l = milligrams per liter
lbs/day = pounds per day
NTU = Nephelometric Turbidity Units

Table 2-7. Mean Stream Discharge, Suspended Sediment, Bedload, and Turbidity measured on Independence Creek in 1981.

Month	Mean Discharge (cfs)	Mean Suspended Sediment Conc. mg/l	Mean Suspended Sediment Load lbs/day	Mean Bedload lbs/day	Total Sediment Load lbs/day	Turbidity NTU
Oct	2.9	2.5	39	NA	39	5.2
Nov	NA	NA	NA	NA	NA	NA
Dec	NA	NA	NA	NA	NA	NA
Jan	NA	NA	NA	NA	NA	NA
Feb	NA	NA	NA	NA	NA	NA
Mar	NA	NA	NA	NA	NA	NA
Apr	NA	NA	NA	NA	NA	NA
May	NA	NA	NA	NA	NA	NA
Jun	11.0	16.6	712	729	1,441	4.0
Jul	7.5	3.3	133	545	677	1.1
Aug	2.3	2.2	27	NA	27	1.2
Sep	3.1	NA	NA	NA	NA	NA

Table adapted from USFS (2003b)
cfs = cubic feet per second.
mg/l = milligrams per liter
lbs/day = pounds per day
NTU = Nephelometric Turbidity Units

Table 2-8. Mean Stream Discharge, Suspended Sediment, Bedload, and Turbidity measured on Moose Creek in 1980-81.

Month	Mean Discharge (cfs)	Mean Suspended Sediment Conc. mg/l	Mean Suspended Sediment Load lbs/day	Mean Bedload lbs/day	Total Sediment Load lbs/day	Turbidity NTU
Oct	37	3	401	0	401	1.2
Nov	71	1.8	690	NA	690	4.3
Dec	NA	NA	NA	NA	NA	NA
Jan	NA	NA	NA	NA	NA	NA
Feb	NA	NA	NA	NA	NA	NA
Mar	NA	NA	NA	NA	NA	NA
Apr	539	9	25103	488	25591	2.3
May	420	5	11189	488	11677	1.1
Jun	352	4	7148	376	7523	1.4
Jul	163	7	5619	254	5872	1.8
Aug	66	2	767	NA	767	0.7
Sep	48	1	325	NA	325	1.6

Table adapted from USFS (2003b)
cfs = cubic feet per second.
mg/l = milligrams per liter
lbs/day = pounds per day

Table 2-9. Relationship between Stream Flow And Stream Velocity at the Mouth of Moose Creek.

Month	Average Stream Discharge cfs	Average Flow Velocity Flow Velocity fps
Oct	72	1.3
Nov	93	1.4
Dec	107	1.5
Jan	92	1.4
Feb	110	1.5
Mar	123	1.6
Apr	362	2.4
May	726	3.0
Jun	513	2.7
Jul	147	1.7
Aug	14764	1.2
Sep	55	1.2

Table adapted from USFS (2003b)
cfs = cubic feet per second
fps = feet per second.

FIGURES

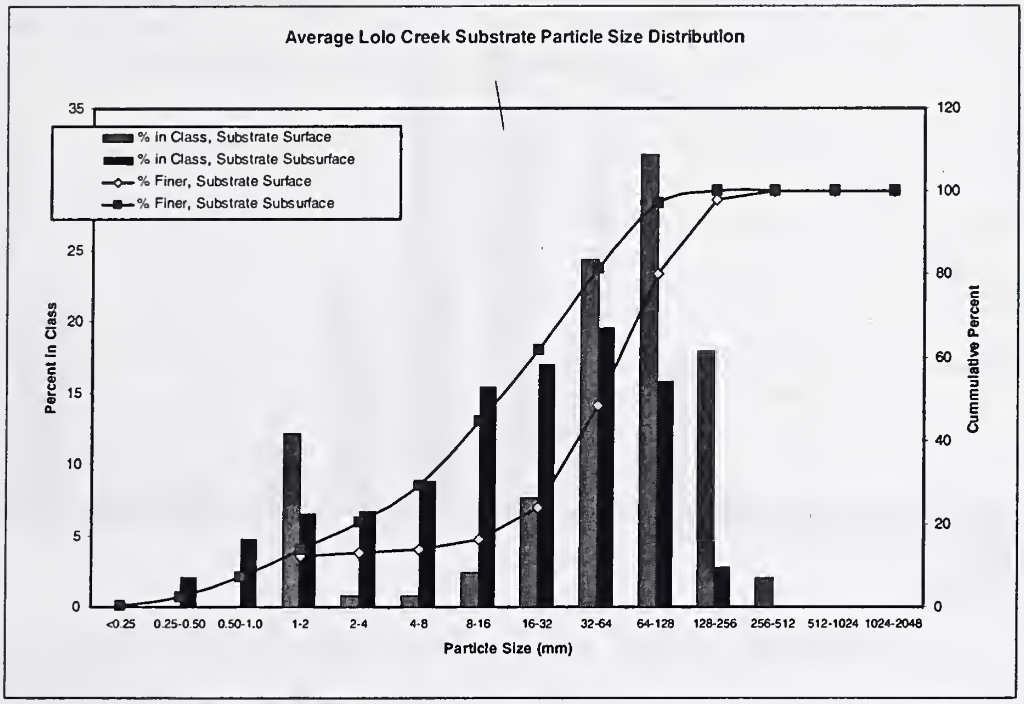

Figure 2-1. Average Particle Size Distribution of Lolo Creek Substrate Materials
Source: (USFS 2003b)

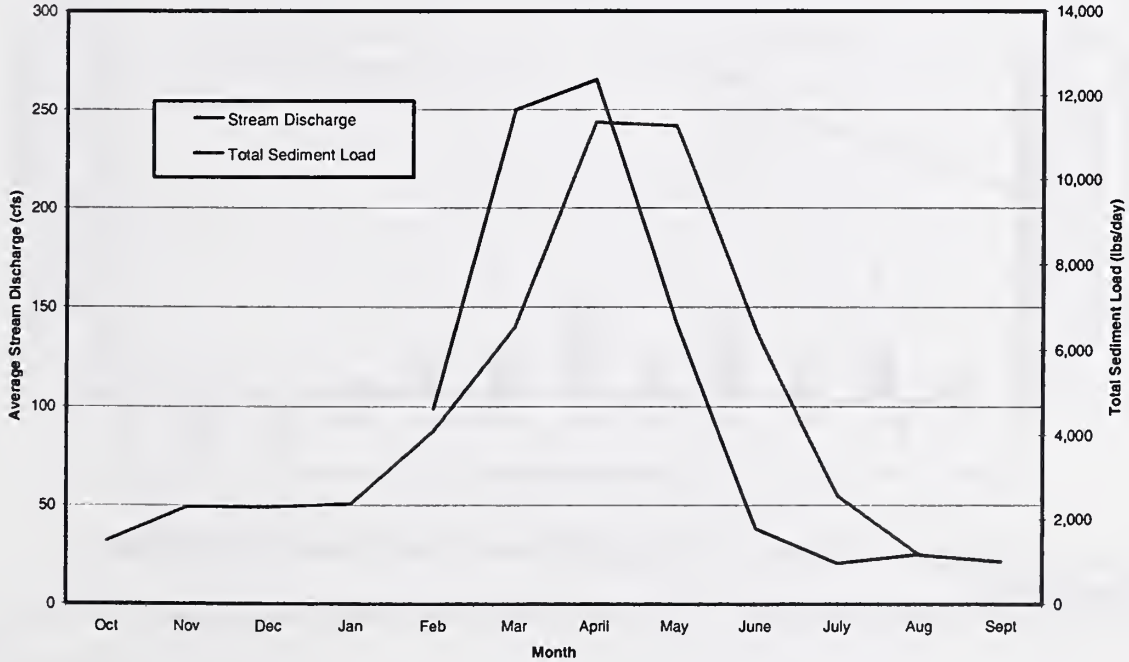

Figure 2-2. Relationship between Stream Discharge and Total Sediment Load at the Lolo Creek Section 6 Bridge.
Source: (USFS 2003b)

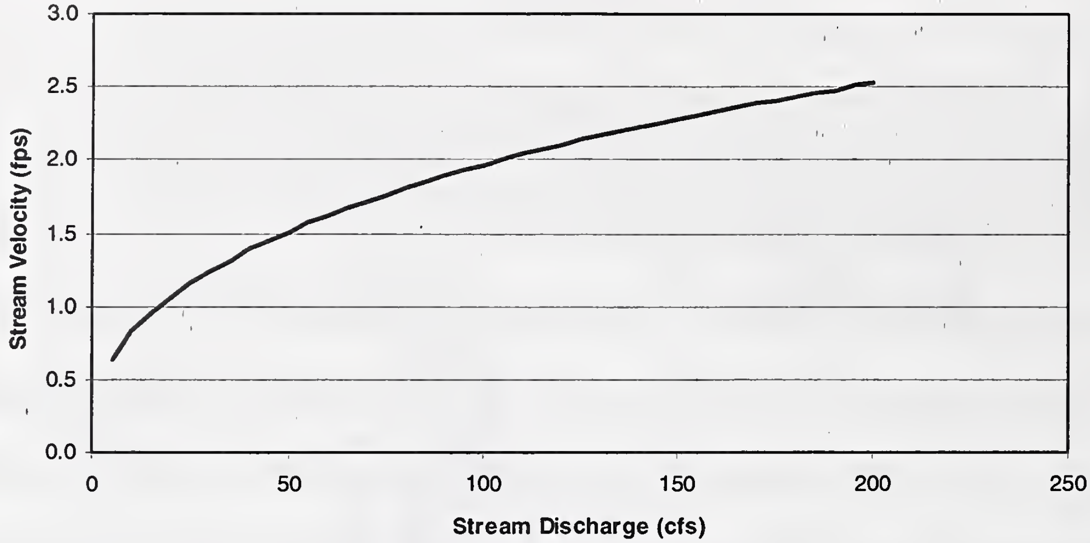

Figure 2-3. Relationship between Stream Flow And Stream Velocity at the Lolo Creek Section 6 Bridge.
Source: (USFS 2003b).

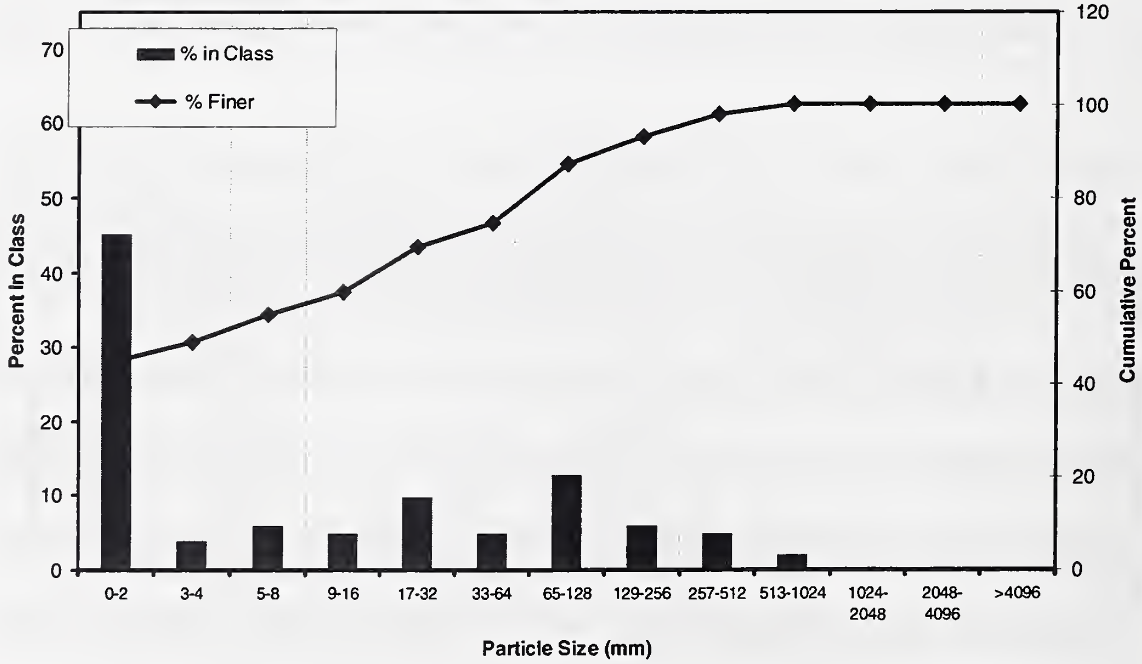

Figure 2-4. Particle Size Distribution of Independence Creek Substrate Materials.
Source: (USFS 2003b).

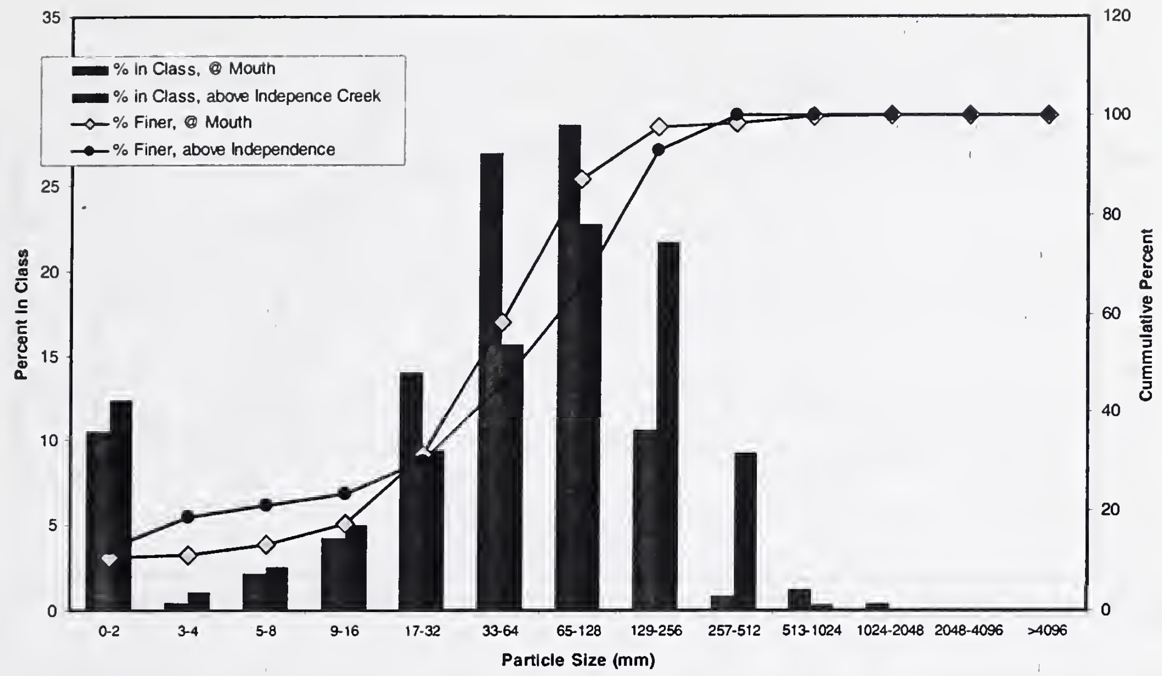

Figure 2-5. Particle Size Distribution of Moose Creek Substrate Materials
Source: (USFS 2003b).

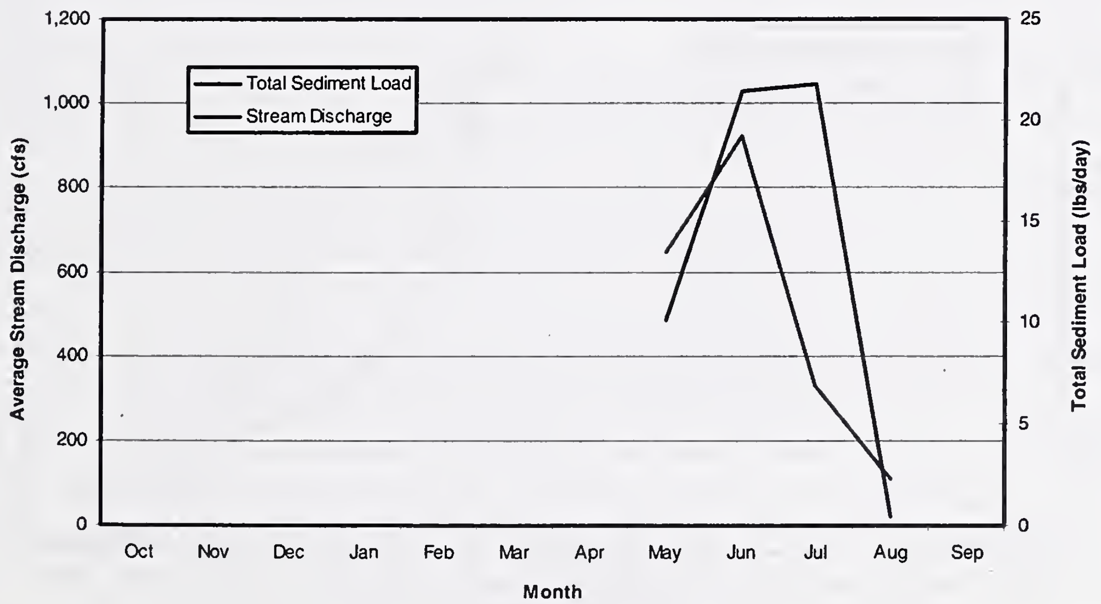

Figure 2-6. Relationship between Stream Discharge and Total Sediment Load for Deadwood Creek.
Source: (USFS 2003b).

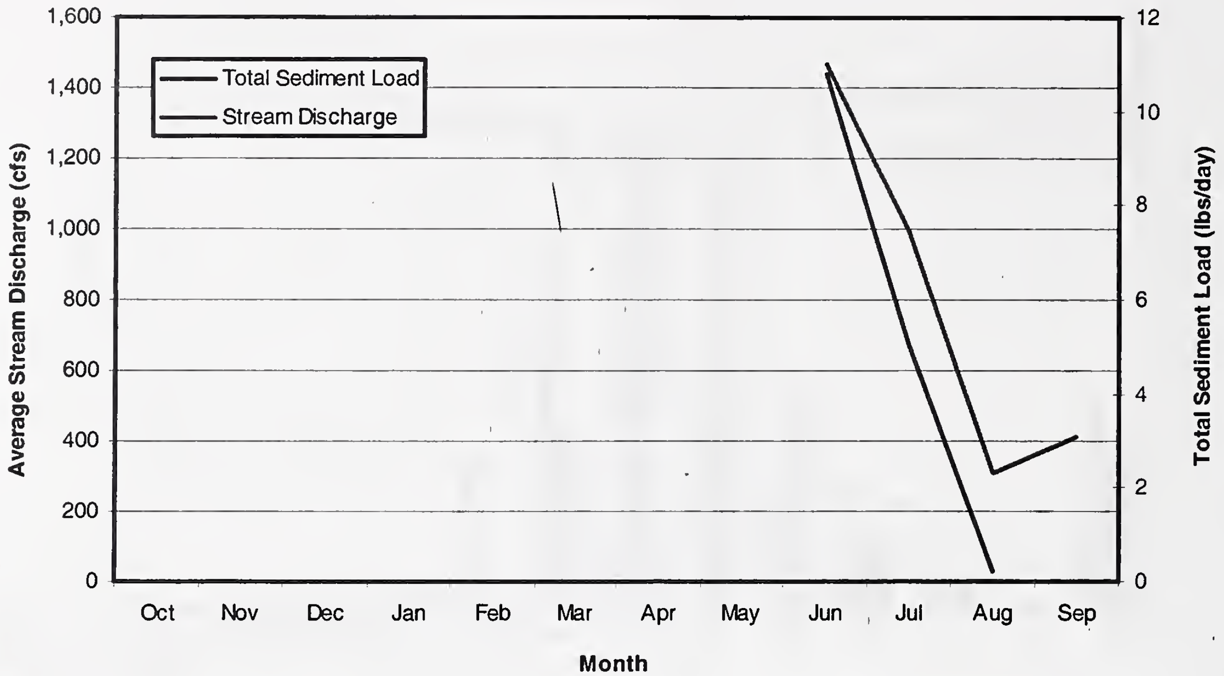

Figure 2-7. Relationship between Stream Discharge and Total Sediment Load for Independence Creek.
Source: (USFS 2003b).

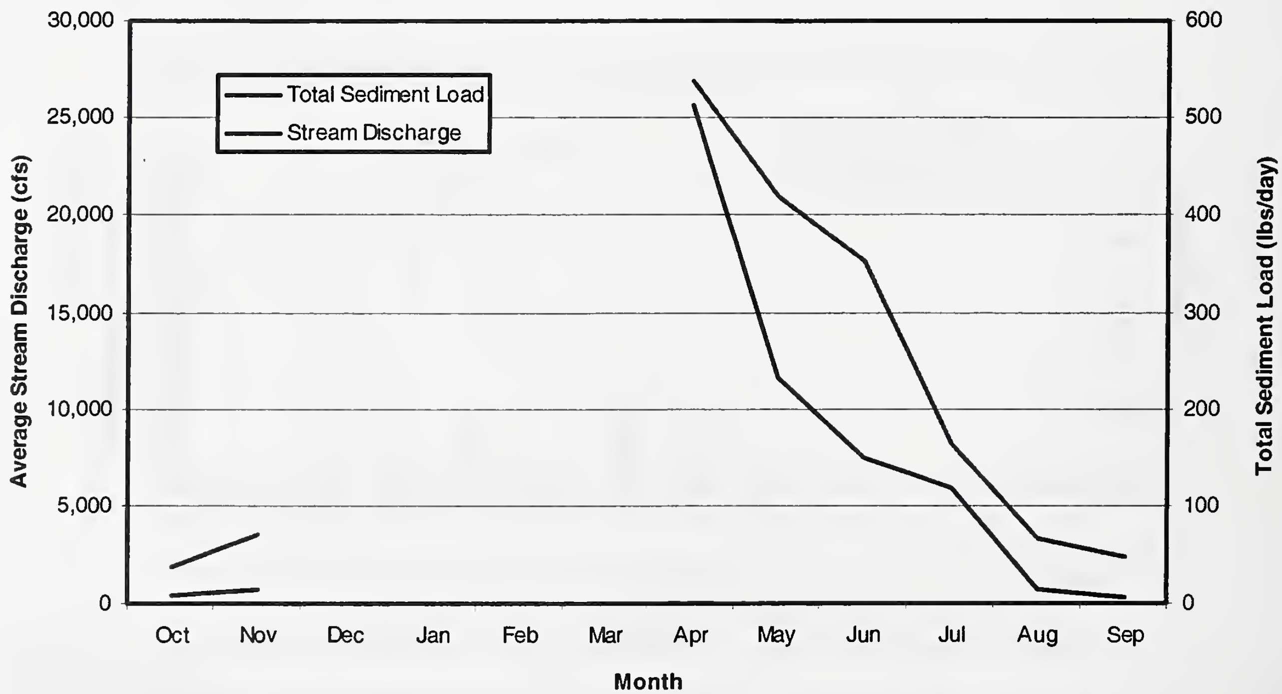

Figure 2-8. Relationship between Stream Discharge and Total Sediment Load for Moose Creek at Mouth.
Source: (USFS 2003b).

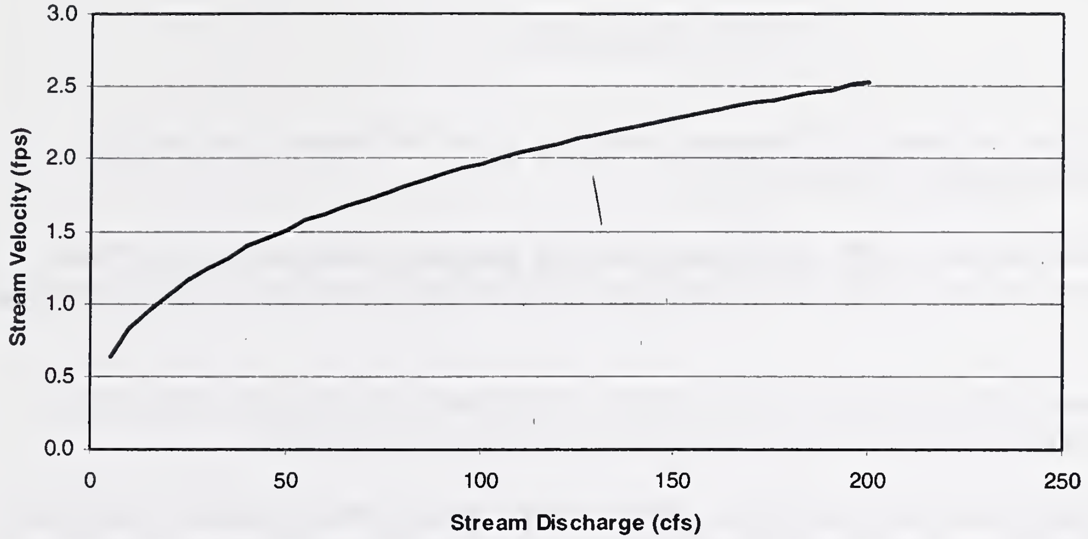

Figure 2-9. Relationship between Stream Flow And Stream Velocity at the Mouth of Moose Creek.
Source: (USFS 2003b).

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APPENDIX B

Fish and Wildlife Resources Technical Background Document

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FISH AND WILDLIFE RESOURCES

The purpose of this technical report is to provide background data on aquatic and wildlife resources to support the draft Environmental Impact Statement (EIS) for small-scale suction dredging in the Clearwater National Forest in north-central Idaho. Two areas are proposed for small-scale suction dredging: the Lolo Creek and Moose Creek project areas. These drainages have had past mining activity under the authority of the 1872 Mining Law. Detailed descriptions of these two project areas and associated mining activity are presented in the EIS chapters 2 and 3.

Under the Endangered Species Act (ESA), the National Marine Fisheries Service (NOAA Fisheries) and the U.S. Fish and Wildlife Service (USFWS) listed steelhead trout and bull trout, respectively as threatened species. The Forest Service has consulted with NOAA Fisheries and the USFWS regarding the potential effects that Forest activities might have on these species. Section 7 Watershed Biological Assessments were prepared for both Lolo Creek (USFS 1999) and Moose Creek (USFS 2000). The Clearwater National Forest also initiated the process of consulting with NOAA Fisheries and USFWS concerning the effects of small-scale suction dredging on these threatened species. In a Biological Assessments (BAs) completed by the Clearwater National Forest (USFS 2002a 2004a), the determination was made that suction dredging was "likely to adversely affect" steelhead trout, but was "not likely to adversely affect" Lolo Creek bull trout. In the BAs for Moose Creek (USFS 2002b, 2004a), the Forest Service determined that suction dredging was "likely to adversely affect bull trout". In their respective Biological Opinions (BOs), NOAA Fisheries (NOAA 2004) and USFWS (2004) agreed with the Forest Service determinations. Both agencies further concluded that suction dredging would not jeopardize the continued existence of either species if specific conservation measures minimizing impacts to streams and minimizing take were adopted. These conservation measures are adopted as part of the proposed action evaluated in the EIS.

There are numerous relevant environmental studies and reports available for the Lolo Creek and Moose Creek project areas. This technical report focuses on those fish and wildlife species that are of most concern that have the potential to be affected by small-scale suction dredge operations. In addition, data for the affected portion of the streams where suction dredge activities are expected to occur are summarized herein. Additional details for each watershed and nearby drainages can be obtained from the documents listed in Table 1 and cited in the reference section.

1.0 FISH

Known fish species in the project areas area include westslope cutthroat (*Oncorhynchus clarki lewisi)*, steelhead/rainbow (*O. mykiss*), bull (*Salvelinus confluentus*), and brook (*S. fontinalis*) trout, spring chinook salmon (*O. tshawytscha*), and kokanee salmon (*O. nerka*) (land-locked sockeye salmon). Mountain whitefish (*Prosopium williamsoni*) and Pacific lamprey (*Entophenus tridentatus*) occur in very low numbers in the mainstem of Lolo Creek (USFS 1999). In addition, a wide variety of aquatic-dependent insects, amphibians, and mammals occur that are dependent on these streams. These non-game species provide a major food source for both aquatic and terrestrial animals.

Table 1. Selected Biological Reports Pertaining to the Lolo Creek and Moose Creek Watersheds

Title	Reference
Lolo Creek	
Biological opinions on recreational suction dredge mining in Lolo Creek – Endangered Species Act Section 7 consultation	NOAA Fisheries, 2003, 2004
Proposed recreational suction dredging during 2002-2003 in the Lolo Creek drainage	USFWS 2002
Biological assessments for threatened, endangered, and proposed species, recreational suction dredging on USFS Lands in the Lolo Creek drainage	USFS 2002a, 2004a
Section 7 watershed biological assessment of the Lolo Creek drainage. Determination of effects and proposed activities based on the matrix of pathways and indicators of watershed condition for steelhead, fall chinook salmon, and bull trout	USFS 1999
Habitat conditions and salmonid abundance in Lolo Creek – summer 1998	Clearwater BioStudies, Inc. 1999a
Habitat conditions and salmonid abundance within Lolo Creek drainage – summer 1997	Clearwater BioStudies, Inc. 1997
Nez Perce Tribal hatchery program final environmental impact statement	USDE 1997
Clearwater subbasin ecosystem analysis at the watershed scale	USFS 1997
Fisheries survey reports for Lolo Creek, Eldorado Creek, Musselshell Creek, and Yoosa Creek tributaries	Isabella Wildlife Works 1995a,b,c,d
Habitat conditions and salmonid abundance in Lolo Creek – Summer 1993	Clearwater BioStudies, Inc. 1994
Habitat conditions and salmonid abundance in Eldrorado, Yoosa and Camp Creeks – summer 1992	Clearwater BioStudies, Inc. 1993a,b
Habitat conditions and salmonid abundance in selected streams in Musselshell Creek and Cedar Creek – summer 1991	Clearwater BioStudies, Inc. 1992a,b
Fish habitat characteristics and salmonid abundance in the Lolo Creek study area – summer 1988	Clearwater BioStudies, Inc. 1988
Moose Creek	
Biological opinions on recreational class suction dredge mining in the Moose Creek – ESA Section 7 consultation	USFWS 2003, 2004
Biological assessments for threatened, endangered, and proposed species, recreational suction dredging on USFS Lands in the Moose Creek drainage	USFS 2002b, 2004b
Section 7 watershed biological assessment of the North Fork Clearwater drainage. Determination of effects of ongoing and proposed activities based on the matrix of pathways and indicators of watershed condition for bull trout	USFS 2000
Habitat conditions and salmonid abundance in selected tributaries to Moose Creek – summer 1998	Clearwater BioStudies, Inc. 1999b

Table 1. Selected Biological Reports Pertaining to the Lolo Creek and Moose Creek Watersheds

Title	Reference
Lolo Creek	
Beneficial use reconnaissance project survey of Pollock Creek, 1999	IDEQ 1999
Summary of snorkeling observations in the North Fork Clearwater drainage, 1993-1997	IDFG 1998
North Fork Clearwater River Basin – Bull trout problem assessment	CBBTAT 1998
Beneficial use reconnaissance project survey of Little Moose Creek	IDEQ 1998
Fisheries survey report, Osier Creek drainage	Isabella Wildlife Works 1996
Biological assessment for bull trout, North Fork Clearwater River key watershed analysis area	Murphy *et al.* 1995
Habitat conditions and salmonid abundance in China and Laundry Creeks – summer 1994	Clearwater BioStudies, Inc. 1995
Habitat conditions and salmonid abundance in selected streams within the Moose Creek drainage – summer 1990	Clearwater BioStudies, Inc. 1991
Habitat conditions and salmonid abundance in the Swamp Ridge area – summer 1989	Clearwater BioStudies, Inc. 1990

Fish species in headwater reaches of the Clearwater River such as westslope cutthroat, bull trout, sculpins (*Cottus sp.*), dace (*Rhinichthys sp.*), and suckers (*Catostomus sp.*) generally require cooler water temperatures, feed primarily on aquatic and terrestrial insects, and are limited in numbers by physical factors such as the availability of pools and cover. Bull trout and westslope cutthroat occur in two distinct life history forms: a resident type which grows slowly and rarely exceeds 10 to 12 inches; and a fluvial type (migrate downstream to feed in larger rivers) that commonly reach 12 to 16 inches in length.

Downstream of the headwater zone and extending all the way to the tributary mouths of the main forks of the Clearwater River, the fish assemblage transitions to one dominated by steelhead, chinook salmon, older cutthroat and bull trout, and mountain whitefish. The change appears to be a function of the local thermal regime. Species found at lower elevations tend to be more temperature tolerant, are either omnivorous or large invertebrate-fish predators, and are regulated in number to a greater degree by biological rather than by physical factors (Li *et al.* 1987).

Westslope cutthroat trout population trends are described in Section 1.2.1. This species is well distributed throughout the drainage and occurs in relatively high numbers in some streams.

Brook trout is a non-native species that is highly competitive with the native species for food and spawning habitat. In addition, larger adults often feed on juvenile steelhead, westslope cutthroat, and/or chinook salmon. Brook trout can also spawn with bull trout creating sterile hybridized offspring. Populations of brook trout occur in random locations in Lolo Creek and appear to be relatively stable (USFS 1999). Brook trout have not been found in Moose Creek.

The basic life history of resident salmonids in the project area streams begins when eggs are deposited in a "redd" (suitable spawning gravel excavated by the adult salmonid), fertilized, and covered with gravel. Following an incubation period ranging from six to 30 weeks (depending on the species and water temperatures), sac fry (alevins) remain in the gravel for varying periods of time before emerging. After emergence, juveniles forage on progressively larger organisms, growing for two to four years to sexual maturity.

1.1 Threatened Fish Species

1.1.1 Chinook Salmon (Oncorhynchus tshawytscha)

The National Marine Fisheries Service (NMFS) listed two stocks of the Snake River chinook salmon (the spring/summer and the fall chinook salmon) as threatened on April 22, 1992 (57 FR 14653). Critical habitat for these two stocks of chinook salmon was designated on December 28, 1993 (58 FR 68543) and revised on October 25, 1999 (64 FR 57399).

Critical habitat for the fall-run chinook includes only the mainstem of the Clearwater River up to the Idaho/Clearwater county line below the town of Greer, Idaho. Most of the fall chinook salmon spawning over the last five years has occurred within the designated critical habitat areas, generally in the Clearwater River downstream of the North Fork Clearwater River. Some limited spawning has been observed near the confluence of Lolo Creek. Fall chinook spawning near Lolo Creek is sporadic and not considered a viable/natural sustaining population (due to natural constraints regarding rearing habitat, water temperatures during incubation and early rearing). Increased number of spawners over the past five years is due to supplementation efforts (USFS 2002a).

Critical habitat for spring/summer chinook salmon does not include tributaries of the Clearwater River, therefore, spring/summer chinook are only considered as a sensitive species in the Lolo Creek project area.

Distribution in Lolo Creek. Spring chinook salmon, because of their large size, usually spawn in mainstem rivers and larger streams where gradients are low, and riffles contain large expanses of gravel/rubble (3-6" diameter). Areas with concentrated spawning include Lolo Creek above Musselshell Creek and in Yoosa Creek. Juvenile rearing occurs throughout the mainstem Lolo Creek, Yoosa below Camp Creek, and the lower reaches of Nevada Creek Juvenile spring chinook salmon prefer pools for rearing.

State, federal, and Nez Perce Tribe hatchery supplementation (stocking) of spring/summer chinook adults in Lolo Creek over the last ten years has substantially increased the number of juveniles in the drainage, with current densities of juvenile spring chinook salmon at $69/100m^2$ and $61/100m^2$ for 2001 and 2002, respectively, for 15 permanent snorkeling stations in Lolo Creek (USFS 2003a).

No historical records or current documentation of fall chinook salmon spawning or rearing within the Lolo Creek watershed are available (USFS 2002a). The mouth of Lolo Creek on the mainstem of the Clearwater River is the upstream boundary of designated critical habitat for fall chinook. Distance from the proposed suction dredging in Lolo Creek to the Clearwater River is over 25 miles. Consequently, no critical habitat for fall-run chinook occurs within the Lolo Creek project area.

Distribution in Moose Creek. The Moose Creek drainage is located over 100 miles upstream of Dworshak Dam. The dam provides a complete migration barrier to anadromous fish and both runs of chinook salmon do not occur there.

1.1.2 Steelhead (Oncorhynchus mykiss)

On August 18, 1997 (62 FR 43937), steelhead trout were listed as a threatened species within the Snake River Basin under the Endangered Species Act (ESA).

General Characteristics. Snake River Basin summer steelhead consist of two groups, an A-run and B-run. These runs are separated based on migration timing, ocean-age, and adult size. A-run Snake River Basin steelhead enter fresh water from June to October and spawn from March to May the following spring. B-run steelhead, which occur in the Clearwater River Basin, enter fresh water from late August to October, passing Bonneville Dam after August 25. B-run steelhead are thought to be generally age-2 ocean fish. B-run steelhead are 75 to 100 mm longer than A-run steelhead trout of the same age due to their longer ocean residency. Unlike most anadromous salmonids, some steelhead are capable of spawning more than once before they die. However, most surviving steelhead in the Clearwater Basin spawn only once (NOAA 2003).

Spawning and initial rearing of juvenile steelhead generally take place in moderate stream gradients, generally from 3 to 5 percent. Eggs deposited in redds hatch in about 35-50 days, depending upon water temperature. Alevins remain in the gravel 2 to 3 weeks until the yolk sac is absorbed, then emerge as fry in late spring, and begin to actively feed. Egg to fry survival is usually near 15 percent. Steelhead usually smolt as 2 or 3 year olds and migrate to the ocean (Busby *et al.* 1996)

Productive steelhead habitat is characterized by complexity, primarily in the form of large and small wood and boulders. Juveniles will take advantage of microhabitats to seek refuge from high water velocity and/or temperatures. Juveniles may move around in a basin to take advantage of favorable

habitat. Steelhead fry prefer protected and complex edge habitat with low water velocity (<0.3 ft/s) and depths generally less than 15 inches deep. Summer rearing takes place primarily in the faster parts of small and deep scour pools with wood or medium to large substrate (cobble or boulders) as cover. Other important summer habitat components used by juveniles are pools with turbulent cover, undercut/scoured streambanks, and pocket water in deep riffles and rapids. Winter rearing occurs more uniformly at lower juvenile densities across a wide range of fast and slow habitat types. Small tributaries and lakes are probably important winter habitat. As juveniles get older, some tend to move downstream to rear in larger tributaries and mainstem rivers (USFS 2002a)

Distribution in Lolo Creek. The Lolo Creek drainage produces very few steelhead due to overall low adult escapement and "poor" habitat conditions. Steelhead production is most likely a combination of wild/natural and hatchery production because of adult and juvenile hatchery plantings over the past 20 years. Steelhead mostly spawn in the mainstem of Lolo Creek (from Musselshell Creek to Yoosa Creek) and any accessible tributaries in upper Lolo and Yoosa creekse. Fish population surveys over the past 15 years have documented juvenile steelhead at most sampling sites throughout the mainstem Lolo Creek (Table 2), with average densities of 0.51, 0.33, and 0.95 fish/100m in 1996, 1998, and 1999, respectively (USFS 2002a). In general, the number of spawning wild steelhead in Lolo Creek is around 100 spawning pairs in any given year (USFS 2002a).

Distribution in Moose Creek. The Dworshak Dam, located approximately 100 miles downstream of the Moose Creek dredging areas, is a complete migration barrier to steelhead.

1.1.3 Bull Trout (Salvelinus confluentus)

On June 10, 1998 (63 FR 31647), bull trout were listed as a threatened species within the Snake River under the ESA. Historical and current information regarding the physical and biological characteristics of the Lolo Creek and Moose Creek watersheds are presented in the biological assessments (USFS 2002a,b) and in the section 7 watershed biological assessments (USFS 1999, 2000).

Table 2. Summary of Steelhead Observations in the Lolo Creek Drainage [a]

Stream/Reach	Number of Fish Sampling Stations	Number of Stations with Steelhead
Lolo mainstem [b]	214	207
11 Lolo tributaries [c]	18	2
Yoosa Creek [c]	39	30
Lolo mainstem [d]	15	15
Lolo mainstem [e]	47	46
Lolo mainstem [f]	68	58
Yoosa Creek [f]	27	24
Lolo Creek (downstream USFS lands) [g]	3	3

a = Does not include pre 1992 data from IDFG and pre 1988 USFS data.
b = Snorkeling data collected between 1988 and 1999 and 2001 by USFS personnel or Clearwater BioStudies, Inc.
c = Snorkeling and/or electrofishing data collected between 1991 and 1997 by USFS personnel, Clearwater BioStudies, Inc., or Isabella Wildlife Works.
d = U.S. Fish and Wildlife Service – Idaho Fishery Unit: Snorkeling data from 1987-1988, and 1990-1991. Two bull trout were observed during the 1987 survey on mainstem Lolo Creek (between White Creek and Yoosa Creek).
e = Idaho Department of Fish and Game: Snorkeling data from 1985 (Petrosky and Holubetz 1986), and 1994 (Hall-Griswold et al. 1995).
f = Nez Perce Tribe snorkeling data from 1993 (USFS 2002a as cited from Hesse and Arnsberg 1994, 1995).
g = U.S. Bureau of Land Management (USBLM 2000) snorkeling data from three sites in Lolo Creek downstream of USFS lands (stream miles: 0.9, 6.7 and 22.0).

General Characteristics. Bull trout populations in the Lolo and Moose creek drainages are generally considered resident and/or fluvial. Adult bull trout spawn in the upper portions of the watersheds, with preferred spawning habitat generally consisting of low gradient stream reaches, intermixed in high gradient reaches, that have loose, clean gravel (Fraley and Shepard 1989) and water temperatures of 5 to 9° C (41 to 48° F) in late summer to early fall (Goetz 1989). Bull trout typically spawn from August to November during periods of decreasing water temperatures. Depending on water temperature, egg incubation is normally 100 to 145 days (Pratt 1992), with juveniles remaining in the substrate after hatching, although time from egg deposition to emergence may surpass 200 days. Fry normally emerge from early April through May depending upon water temperatures and increasing stream flows (Pratt 1992; Ratliff and Howell 1992).

Distribution in Lolo Creek. Between 1974 and 2000, very few bull trout were observed during snorkeling and electrofishing fish monitoring surveys in the Lolo Creek drainage. The Clearwater Basin Bull Trout Technical Advisory Team (CBBTAT 1998) reported that the USFWS, IDFG, and Nez Perce Tribe observed several bull trout during snorkeling surveys in the mainstem of Lolo Creek between 1987 and 1994. However, bull trout were not observed by these agencies or by the Forest Service during fish monitoring in 1996-1998 and bull trout were not observed by the Forest Service in 2002. In addition, bull trout have not been observed in the Eldorado Creek, Musselshell Creek or Yoosa Creek drainages. The extent of bull trout spawning and production is considered very low (Table 3). Habitat conditions and warmer temperature regimes appear to limit bull trout production in the Lolo Creek drainage.

Table 3. Summary of Bull Trout Observations in the Lolo Creek Drainage [a]

Stream/Reach	Number of Fish Sampling Stations	Number of Stations with Bull Trout	Bull Trout Age Classes and Densities
Lolo mainstem [b]	214	0	
11 Lolo tributaries [c]	18	0	
Yoosa Creek [c]	39	0	
Lolo mainstem [d]	15	2	Two juvenile bull trout; 1-4" and 1-5" in 1987.
Lolo mainstem [e]	47	0	
Lolo mainstem [f]	68	3	One juvenile bull trout 1993 and two juvenile bull trout 1994.
Yoosa Creek [f]	27	0	
Lolo Creek (downstream USFS lands) [g]	3	1	One 6-9" bull trout sighted at station #2

a = Does not include pre 1992 data from IDFG and pre 1988 USFS data.
b = Snorkeling data collected between 1988 and 1999 and 2001 by USFS personnel or Clearwater BioStudies, Inc.
c = Snorkeling and/or electrofishing data collected between 1991 and 1997 by USFS personnel, Clearwater BioStudies, Inc., or Isabella Wildlife Works.
d = U.S. Fish and Wildlife Service – Idaho Fishery Unit: Snorkeling data from 1987-1988, and 1990-1991. Two bull trout were observed during the 1987 survey on mainstem Lolo Creek (between White Creek and Yoosa Creek).
e = Idaho Department of Fish and Game: Snorkeling data from 1985 (Petrosky and Holubetz 1986), and 1994 (Hall-Griswold et al. 1995).
f = Nez Perce Tribe snorkeling data from 1993 (USFS 2002a as cited from Hesse and Arnsberg 1994, 1995).
g = U.S. Bureau of Land Management (USBLM 2000) snorkeling data from three sites in Lolo Creek downstream of USFS lands (stream miles: 0.9, 6.7 and 22.0).

Presently, westslope cutthroat trout is the dominant fish species in the headwater streams of Lolo Creek, with strong populations of brook trout in the Musselshell Creek drainage a few scattered brook trout populations in the Yoosa Creek drainage. Overall, the fish population data does not indicate any bull trout spawning and early rearing in the Lolo Creek drainage over the past several years.

Distribution in Moose Creek. Moose Creek currently supports a small number of bull trout. Overall, westslope cutthroat trout is the dominant species with low numbers of redband/steelhead trout and bull trout (Clearwater BioStudies, Inc. 1991). Bull trout population information is summarized in Table 4.

A few age 1+ and 2+ bull trout were found in Moose Creek below the confluences with Deadwood and Independence creeks during a 1990 stream survey (Clearwater BioStudies, Inc. 1991). A 1983 re-survey by Moffitt and Bjornn (1984) for the Idaho Department of Fish and Game (IDFG 1998) did not observe bull trout at sampling stations in Little Moose and Ruby creeks. No bull trout were observed in a 1995 survey of the Osier Creek drainage (Isabella Wildlife Works 1996) and no bull trout were observed during surveys on Ruby and Craig creeks and the Little Moose Creek drainage in 1998 (Clearwater BioStudies, Inc. 1999b).

Table 4. Summary of Bull Trout Observations in the Moose Creek Drainage 1983-2001

Stream	Number of Fish Sampling Stations	Number of Stations with Bull Trout	Bull Trout Age Classes and Densities
Moose Creek – mainstem	28	7	Age 1 = 0.2/100m^2* Age 2 + = 0.2/100m^2 Age 4 + = 1 fish ** Age 4 + = 3 fish ***
Little Moose Creek [a, b, c]	17	3	
Swamp Creek	3	0	
Osier Creek (mainstem)	8	2	Age 4 + = 2 fish ****
Independence Creek	5	0	
Deadwood Creek [d]	2	0	
Ruby Creek [e]	4	1	Age 1 = 1.3/100m^2 Age 2 = 1.3/100m^2

* In Moose Creek, there were two stations with age 1 bull trout with a density of 0.2/100m^2.
** One adult bull trout observed in mainstem Moose Creek in 2000 directly downstream of Deadwood Creek.
***Three adult bull trout observed in mainstem Moose Creek in 2001; two downstream of Osier Creek and one upstream mouth.
**** Two adult bull trout observed in Osier Creek in 2001, downstream of Swamp Creek.
a = IDEQ survey on Little Moose Creek on 7/29/1998. During their electro-shocking, they captured one (age 4) bull trout (240 – 249 mm) approximately 0.25 miles upstream from the mouth.
b = The Nez Perce tribal fisheries program conducted a genetics survey on westslope cutthroat trout in Little Moose Creek in the summer of 1999. They captured a small bull trout (approx. 50 mm) about one mile downstream from Wapito Creek. They also noted a 3 yr. old bull trout natural mortality near their shocking site (USFS 2002b).
c = IDFG have three snorkel transects in Little Moose Creek that have been surveyed from 1994-1997. They observed no bull trout at these transects.
d = Two stations snorkeled in 2000.
e = IDFG has one snorkel transect in Ruby Creek and have snorkeled this site from 1994-1997. They observed no bull trout during their surveys.

Prior to 2000, the fish observations indicated that limited bull trout spawning and rearing was occurring in the Moose Creek drainage. However, additional snorkeling surveys conducted during 2000-2001 found an increase in the numbers of adult bull trout in the Moose Creek drainage and also documented spawning in the lower Osier Creek drainage. Moose Creek is proposed as critical habitat from its confluence with Kelly Creek upstream 9.5 miles to a gradient break near the headwaters (67 FR 71276, 11/29/02).

1.2 Sensitive Fish Species (Forest Service Designated)

Westslope Cutthroat Trout. The Lolo and Moose creek watersheds support populations of cutthroat trout. In general, cutthroat trout have a wide distribution and are found in streams with 18-inch wide channels. The highest densities are found in the small tributary streams, and in the mid and upper reaches of the larger streams where competition with other trout or salmon species is limited (USFS 1999). Cutthroat spawning occurs in pockets of 0.5-2 inch diameter gravel in pool tailouts and in runs. Gravel in these pockets is relatively shallow but adequate for egg incubation, which is why cutthroat trout survive in small or headwater streams. Rearing occurs in pools, along stream margins, and in pocket water habitats, depending on the size of the fish.

The westslope cutthroat population in the upper Lolo Creek watershed is considered strong with densities averaging 2.3 (age 2+) fish/100 square meters (Clearwater BioStudies, Inc. 1999a). Designated critical reaches for cutthroat occur primarily in low gradient areas of tributaries and in Lolo Creek above Dutchman Creek. In the Moose Creek watershed, spawning and rearing habitat is present for supporting populations of cutthroat trout.

Spring chinook salmon, also considered a sensitive species, is found in Lolo Creek and was discussed in Section 1.1.1.

1.3 Non-Game Fish Species

Pacific lamprey is a federal species of concern and is listed by the Idaho Department of Fish and Game as a state endangered species. Pacific lamprey have an anadromous life history where young adults migrate to the ocean, remain there for up to 4 years, then return to streams to spawn (April to July), after which time they die. Upon hatching, juvenile lamprey (ammocetes) typically embed themselves in sand-dominated, low gradient channels where they filter-feed and grow. They typically rear in these areas for up to 7 years before migrating to the ocean to become parasitic on various ocean fish (Moser and Close 2003). Some lamprey spawning habitat (low-gradient gravel substrate areas) occurs in the mainstem of Lolo Creek, and data from the Nez Perce Tribe indicates the presence of juvenile and young adult lampreys (USDE 1997). However, lampreys do not occur in the Moose Creek drainage due to the presence of the Dworshak Dam.

Mountain whitefish prefer cold (8-10°C) mountain streams with large riffles or pools averaging 3-4 feet in depth (Lusch 1985). They are primarily bottom feeders with a preference for insects, snails, amphipods and crawfish. Mature whitefish also eat salmonid fry and whitefish eggs. Whitefish are broadcast spawners that require a gravel bottom surface for eggs to adhere. Whitefish occur in very low numbers in Lolo Creek and although the creek provides spawning opportunities, summer water temperatures may limit juvenile survival (USFS 2000).

Sculpins occur in Lolo and Moose creek drainages but there is no information on their abundance and distribution. Sculpins generally prefer small cobble-sized substrate for breeding and non-

embedded substrate in run/pool type habitats for cover. They are an important food source for other aquatic and terrestrial animals (USFS 2000).

1.4 Aquatic Invertebrates

The presence, distribution, and abundance of aquatic insects are dependent upon basic habitat constituents such as water temperature, water quality and chemistry, substrate, and flow conditions. In general, the four most important aquatic insect groups or "orders" that comprise the diet of stream salmonids and many other fish include true flies (order: Diptera), mayflies (Ephemeroptera), caddisflies (Tricoptera), and stoneflies (Plecoptera). Insects from these last three orders are collectively called EPT taxa.

Aquatic insects are a primary food source of juvenile salmon and trout, and are a large part of the diet of resident adult trout and other coldwater fish. Aquatic insects use their habitat in many ways, including clinging to the sides of cobble and boulders not exposed to sunlight, living in crevices and interstices of gravels, or burrowing in mud and sand in stream margins. Most EPT taxa and true flies spend the majority of their life in the aquatic environment, pupate, crawl or fly from the water as winged subadults, and shortly thereafter undergo a final molt into a sexually mature adult. The terrestrial period of life is primarily for mating and egg deposition, and usually ranges from a day (for most mayflies) up to several months.

There are no aquatic invertebrate survey data in the two project areas that are relevant to assessing potential impacts as a result of suction dredging operations or to adequately describe invertebrate baseline conditions within the project areas.

2.0 Wildlife

This section provides a general description of wildlife that utilize riparian habitat in the Lolo and Moose creek watersheds.

2.1 Birds

Riparian forests and wetlands along the Clearwater River and larger tributaries provide perching and nesting opportunities and concentrated prey for many raptor species (Asherin and Orme 1978). Of these, only the osprey (*Pandion haliaetus*), northern harrier (Circus cyaneus), and bald eagle *(Haliaeetus leucocephalus)* are directly associated with riparian and wetland habitats. The bald eagle is discussed in Section 2.3.1. Osprey nest along the corridors of the mainstem rivers of the Clearwater basin and although there may be some transitory use of tributaries such as Lolo Creek, osprey are not known to nest there. Northern harriers use meadow areas located in the Lolo Creek watershed. These birds feed mostly on rodents (Asherin and Orme 1978).

Blue heron *(Ardea herodias)* forage and nest along mainstem rivers. Occasionally, they are observed in the larger tributaries of the upland drainages. Belted kingfishers (*Ceryle alcyon*) and dippers (*Cinclus mexicanus*) are relatively common in area tributaries foraging on aquatic insects and fish, and nest in streambanks or nearby slopes. Waterfowl may occasionally use the riparian habitats in the project areas occasionally and during migrations.

Blue (Dendragapus obscurus) and ruffed (Bonasa umbellus) grouse make transitory use of upland riparian habitats. Other upland game birds such as ring-necked pheasant (Phasianus colchicus), mourning doves (Zenaida macroura) , chukar partridges (*Alectoris chukar*), and valley quail

(Lophortyx californica) may occasionally use the riparian habitats in the Lolo and Moose Creek watersheds.

2.2 Mammals

Aquatic furbearers such as beaver (*Castor Canadensis)*, muskrat *(Ondatra zibethicus)*, fisher (*Martes pennanti)*, mink (Mustela vison), and river otter *(Lutra Canadensis)* occur in the lower Clearwater River corridors and in upland watersheds. In general, these animals depend on riverine areas, bays, ponds, tributaries, and riparian forests for den sites and foraging areas. Riparian zones also serve as dispersal, travel, and prey base corridors (Jones and Heinemeyer 1994).

Beaver are common in the project watersheds and river otter may be found in the lower portions of Lolo Creek. Beaver distribution is strongly related to the presence of riparian food sources such as cottonwood trees and willows plus protected areas such as sloughs, inlets, and ponds (Asherin and Orme 1978). Mink and river otter use slackwater habitats for foraging and denning. Fishers typically use mid-to-late successional forests and riparian zones. These forest types have multilayered canopies which help regulate temperatures and provide suitable denning sites (cavities and downed logs). Raccoons *(Procyon lotor)* frequent stream and riparian habitats and forage on fish and mussels found in the tributary streams.

Big game species such as white-tailed deer (Odocoileus virginianus), mule deer (*Odocoileus hemionus),* elk *(Cervus elaphus nelsoni)*. black bear *(Ursus americanus)*, cougar *(Felis concolor),* and moose (*Alces alces*) may occur in the project areas. These animals may use riparian corridors to move between summer and winter ranges and sometimes for calving and fawning. During severe winters, riparian habitats can provide cover necessary for survival.

2.3 Threatened and Endangered Wildlife

Bald Eagle (Haliaeetus leucocephalus)

The bald eagle is protected under the ESA (1973), Bald Eagle Protection Act (1940), Migratory Bird Treaty Act (1918), and Lacey Act (1901). The Pacific Bald Eagle Recovery Plan (USFWS 1986) provides strategies to protect and recover bald eagle populations in Idaho. Forest Plan standards direct the Clearwater National Forest to manage active identified bald eagle nesting, roosting, and perching sites to maintain their use and future recovery efforts.

Bald eagles use the Clearwater mainstem corridors during the winter (September through April), which provides suitable winter habitat in the form of perch sites, roost sites, and access to prey. They are not known to frequent the upland tributary networks to any significant degree, mainly because the creeks are usually frozen during winters. In the spring of 1999, an unsuccessful nest attempt was documented nearby to the Clearwater National Forest on Dworshak Reservoir. This location is at least 60 miles from the project area. No historical or current evidence documents nesting or breeding on the Clearwater National Forest. Essential habitat for bald eagles on the Clearwater National Forest is restricted to 0.5 miles on either side of the Lochsa , Middle Fork of the Clearwater and North Fork of the Clearwater rivers, and lower portions of the Weitas, Kelly, and Cayuse creeks, for approximately 175,000 acres of suitable winter habitat.

No use by bald eagles has been documented for the Lolo Creek drainage (USFS 2002a). However, wintering bald eagles are occasionally sighted within the Moose Creek drainage, but no use has been documented (USFS 2002b). Wintering eagles have been observed downstream on the North Fork

and mainstem Clearwater rivers. No suction dredge activities are proposed to occur during the winter months when bald eagles may be present in the project area.

Grizzly Bear (Ursus arctos horribilis)

The grizzly bear is protected by the ESA. The revised Grizzly Bear Recovery Plan (USFWS 1993) provides broad recovery objectives for the bear. There have been no confirmed reports of grizzly bears on the Clearwater and Nez Perce National Forests since 1956 (Davis 1994 and USDE 1997, as cited from Blair 1995). Thus there are no grizzly bear in or near the Lolo or Moose creek drainages and they are not expected to inhabit these drainages.

Gray Wolf (Canis lupus)

Under the authority of the ESA, the U.S. Fish and Wildlife Service currently considers the gray wolf nonessential experimental status. Wolves have been translocated from Canada into the Central Idaho Experimental Management Area since January 1995. Strategies to protect and recover populations are provided in the Northern Rocky Mountain Wolf Recovery Plan (USFWS 1987) and in the final EIS for the reintroduction of gray wolves into Yellowstone National Park and Central Idaho (USFWS 1994). One such management strategy is to limit activities within one mile of active wolf dens or rendezvous sites from March 15 to July 1.

The Lolo and Moose creek drainages are within the boundary of the Central Idaho nonessential population area for the gray wolf. Approximately 10 wolves currently occupy habitat in and adjacent to these areas. There have been no confirmed observations of breeding pairs, pack formation, young pups, dens, or suspected rendezvous sites within the project areas.

Lynx (Lynx canadensis)

The U.S. Fish and Wildlife Service listed the lynx as a threatened species on March 24, 2000 (65 FR 16052). The lynx is a wide-ranging predator that could use the project area on occasion. Nellis (1989) estimated that most home ranges encompass 5 to 20 square miles, but home ranges up to 94 square miles have been reported. Ruggiero *et al.* (1994) reported the lynx occurs primarily in the boreal forest of Alaska and Canada, but its range extends south into the northern portions of the western mountains that support similar boreal forest habitats. Detailed descriptions of habitat use and management objectives for the lynx is provided in the Canada Lynx Biological Assessment (USFS 2001). There have been only nine lynx sightings in Clearwater County recorded between 1942 and 1995 (USFS 2001). Project areas are not within suitable lynx habitat.

2.4 Sensitive Wildlife and Management Indicator Species (Forest Service Designated)

This section provides a description of the sensitive wildlife species and wildlife management indicator species within the Clearwater National Forest. Most of these species are listed as a federal or state species of concern deserving of greater management scrutiny. The habitat requirements for these various species range from a few acres to hundreds of square miles. Table 5 provides a list of the species, a brief description of their habitat, and their likelihood of occurrence in the project areas affected by small-scale suction dredging.

Table 5. Sensitive Wildlife and Management Indicator Species

Species	Habitat Description	Likelihood of Occurrence [a]
Management Indicator Species		
Elk *Cervus elaphus*	Grasses, forbs and some dryland shrubs provide nutritious forage for elk throughout the summer and into the fall. These areas (often most evident on major ridges and within upland basins) typically support high to moderate habitat use. A large percentage of the pregnant cows calve on broad gentle ridges where seclusion from human disturbance is important.	Elk are widespread in both project areas. The lower and western portions of the Lolo Creek are used by elk during mild winters (USFS 2003). The lower portions of Moose and Kelly creeks provide winter habitat.
Moose *Alces alces*	Moose are wide-ranging, preferring shrubby, mixed coniferous forests with nearby lakes and marshes, and streams. They generally require water bodies for foraging. They browse on new growth of trees and shrubs (e.g., willow, aspen and fir) and on vegetation associated with water. Moose breed in September to late October, and calves are born late May-early June.	Moose are relatively common in the project areas where riparian areas provide both browse forage and dense hiding cover.
White-tailed deer *Odocoileus virginianus*	These deer typically use mixed deciduous/conifer forests near water for dense cover and forage food. They breed in the fall and fawns are born in spring.	Year-round deer habitat is considered moderate to heavy ~~in~~ both project areas.
American marten *Martes americana*	Martens prefer dense, high-elevation grand fir, subalpine forests. They also utilize high elevation riparian areas. Moist habitats of mature lodgepole pine and dense cedar/grand fir forests are utilized at lower elevations. Down logs and snags provide refuge and den sites. The size of a marten's home range is 0.8 to 15.7 km^2 (Ruggiero *et al.* 1994).	Suitable marten habitat is present in upper Lolo creek (USFS 2003), and the Moose Creek drainage.
Pileated woodpecker *Dryocopus pileatus*	Pileated woodpeckers primarily utilize 20 inch or greater diameter-breast-height snags for nesting; however, they are known to forage on large snags and down dead wood, feeding principally on carpenter ants. Pileated woodpeckers tend to avoid open areas for foraging, preferring forests with significant old-growth component and high basal area (USFS 2003).	Pileated woodpeckers are not likely to utilize the riparian areas for nesting, but may occasionally use the vicinity for foraging.
Belted kingfisher *Megaceryle alcyon*	Kingfishers (a neotropical species) are predators of small fish where they hunt by perching over or along the stream. Therefore, fairly wide-open stream courses without significant emergent vegetation and clear water are preferred.	This species is common along Lolo Creek and its major tributaries. It is also expected along Moose Creek.
Sensitive Wildlife Species		
Fisher *Martes pennanti*	Fishers tend to select moist habitats, characterized by dense canopy cover, in mature or late mature stands of lodgepole pine, spruce, subalpine fir grand fir or cedar. Fisher habitat use is typically within 400 m from perennial streams with forested riparian areas, often in proximity to alder glades and small meadows. The primary prey of fishers is small mammals (such as squirrels and snowshoe hare), while carrion is also utilized. The average home range for fishers range from 15 km^2 for females to 40 km^2 for males (Ruggiero *et al.* 1994, p. 43). Most	Due to the prevalence of fisher habitat in the Lolo and Moose creek drainages, fishers are expected to be relatively common.

Table 5. Sensitive Wildlife and Management Indicator Species

Species	Habitat Description	Likelihood of Occurrence [a]
	studies suggest that fishers are tolerant of moderate human activities.	
Wolverine *Gulo gulo*	Wolverines typically inhabit large areas of medium or scattered mature forest areas around slides, cliffs, swamps and meadows. Habitat types used by wolverines include sub-alpine fir, lodgepole pine, western larch, Douglas fir and mixed conifers. They typically inhabit remote mountainous areas where human disturbance is unlikely. Home ranges for females in Idaho range between 16-516 km^2 (Ruggiero *et al.* 1994).	The riparian areas along the project creeks provide poor habitat and the level of human activity would preclude wolverine use in the affected area.
Townsend's big-eared bat *Plecotus townsendii*	Western big-eared bats are more commonly found in southern Idaho and at much lower elevations than those of the project areas. They are communal and utilize natural caves or old underground mines and, occasionally, old buildings.	There are no caves, buildings, mines, or bridges that appear to meet the criteria for suitable habitat in the project areas.
Northern goshawk *Accipter gentillis*	The Northern goshawk is a forest-adapted raptor that prefers mature coniferous stands with dense canopy cover and mature forest edge. They typically nest in stands of mature or late mature forest that are larger than 25 acres and have relatively dense crown closure. Northern goshawks typically feed on a variety of forest dwelling mammals and birds ranging in size from snowshoe hares to chipmunks.	Riparian zones along the project areas are not suitable for nesting. However, this species has been sighted in the Lolo Creek watershed and is ~~also~~ expected to be present in the Moose Creek drainage.
Flammulated owl *Otus flammeolus*	Flammulated owls are typically associated with large ponderosa pine and Douglas fir trees on south and western slopes. Suitable habitat varies from open, large ponderosa pine (with little under-story) to multi-layered and closed-canopies. This owl preys only on insects and typically forages in the edge habitats between forest and grassland, as well as in forests of low or moderate density. Breeding territories are typically located near open areas, including old burns, grassy hillsides, natural clearings and some logged areas. They often nest in cavities previously constructed by flickers or pileated woodpeckers.	The project areas do not contain suitable habitat for the flammulated owl.
Black-backed woodpecker *Picoides arcticus*	Large burned forests during early postfire years are potentially important source habitats and believed critical for supporting black-backed woodpecker populations. Burned conifer forests and other insect infested forests provide key conditions necessary for both nesting and foraging.	There are no documented sightings and suitable habitat is very limited in the Lolo and Moose creek project areas.
Harlequin duck *Histrionicus histrionicus*	Harlequin ducks are diving ducks that winter along the Pacific coast and then migrate inland to nest along forested, mountain streams. Harlequin ducks prefer streams in canyons, or meandering and braided streams. They prefer dense riparian vegetation for cover and undisturbed, pristine areas are considered prime habitat for Harlequin duck nesting and brood-rearing activities.	Breeding has not been documented in the Clearwater National Forest, but a few sightings have been reported in the upper Lochsa River area and near the mouth of Papoose Creek (USDE 1997 as cited from USDA 1995). There is a very low probability occurrence in the project areas.

Table 5. Sensitive Wildlife and Management Indicator Species

Species	Habitat Description	Likelihood of Occurrence [a]
Western (Boreal) toad *Bufo boreas boreas*	This species utilizes spring pools and slow-moving portions of streams. They generally breed in early July, depending on runoff water during May and June. Tadpole larvae are usually restricted over muddy bottoms where they feed on detritus or filtering suspended plant material. They metamorphose into adults during summer and early fall (Nussbaum *et al.* 1983).	The boreal toad is likely to be present in the project areas since suitable habitat exists.
Coeur d'Alene salamander *Plethodon vandykei idahoensis*	This salamander is usually found in moist, forested areas at moderate elevations below 5,000 feet. They occur in wet, humid and cool microhabitats. Typical habitat features are fractured bedrock or gravel, often under a dense tree canopy, near cascading water. Coeur d'Alene salamanders feed primarily on aquatic and semi-aquatic insects.	Local populations appear to represent the most southern distribution of Coeur d'Alene salamanders. Although there are no reported sightings, some suitable habitat does exist in both project areas.
Northern leopard frog *Rana pipiens*	The northern leopard frog is found in marshes and wet meadows from low valleys to mountain ridges. It is also found in areas virtually devoid of fish, preferring cattail or sedge marshes and weedy ponds for breeding.	There are no known or suspected occurrences of these frogs in the Clearwater National Forest.

A = Likelihood of occurrence as described in USFS (2003b)

3.0 Habitat Characteristics

This section provides a summary of the most recent habitat data in the stream reaches affected by small suction dredge operations.

3.1 Lolo Creek

Table 6 provides a summary of stream channel and aquatic habitat characteristics in the Lolo Creek project area between the confluences of Eldorado Creek and Yoosa Creek. The stream has predominantly B3 and C3 channel types (moderately confined to confined, low to moderate gradient, cobble reaches). The streambanks are stable due to abundant vegetation and large channel/bank substrate. Cobble embeddedness is greater than the Forest Plan desired future condition of 35 percent embeddedness or less. Lolo Creek is a perennial stream with a bankfull streamflow of about 770 cfs. Flow and stream discharge data and water quality are discussed in the technical background document on hydrology.

Table 6. Summary of Lolo Creek Aquatic Habitat Characteristics [a]

Rosgen Classification	2% A, 46% B, 52% C
Average Gradient	1.1 %
Stream Width	11.0 m
Stream Depth	0.253 m
Thalweg Depth	0.497 m
Bank Stability	4.6 (Stable)
Cobble Embeddedness [b]	45 %
Pool:Riffle Ratio [c]	61 : 39
Acting Debris / Potential Debris [d]	4 / 13
Pool Quality	2.6 (Good)
Instream Cover	2.3 (Moderate)
Bank Cover	1.1 (Sparse)

a = Averages derived from 1998 summer stream survey data between Eldorado Creek and Yoosa Creek (Clearwater BioStudies, Inc. 1999a).
b = The target cobble embeddedness rate for the Forest Plan should be less than 35 %.
c = The target pool:riffle ratio is 40:60 for Rosgen B channels and 50:50 for C channels.
d = Acting debris = Pieces of in-channel wood per 100m. Potential debris = riparian conifers available for recruitment into the channel per 100 m. (Forest Plan recommends 40 pieces Acting and 80 pieces potential per 100 meters of stream)

Table 7 provides the average percentages of material comprising the substrate in Lolo Creek between the confluences of Eldorado Creek and Yoosa Creek (Clearwater BioStudies, Inc. 1999a). Data indicate that about 50 percent of the substrate consists of large rubble and boulders, which provides excellent fish rearing habitat. Table 8 summarizes the average percentages of spawning habitat for various fish within the Lolo Creek project reach, based on the 1998 habitat survey (Clearwater BioStudies, Inc. 1999a). Data indicate that steelhead and chinook salmon have the most and resident salmonids the least amount of spawning habitat in Lolo Creek.

Table 7. Average Percent (%) Substrate Composition in Lolo Creek	
Bedrock	3.1
Boulders (>30.5 cm)	19.9
Large rubble (15.2 – 30.5 cm)	29.5
Small rubble (cobbles, 7.6 – 15.2 cm)	29.7
Coarse gravel (2.5 – 7.6 cm)	11.1
Small gravel (0.6 – 2.5 cm)	1.2
Sand (<0.6 cm)	4.6
Silt	0.8
Organic debris	0.1
Source: Clearwater BioStudies, Inc. 1999a	

Table 8. Percent of Lolo Creek Substrate Available for Spawning

Fish	Good	Fair	Poor	Total %
Resident salmonid (spring)	0.2	0.4	0.5	1.1
Resident salmonid (fall)	< 0.1	0.2	0.6	0.8
Steelhead trout	1.6	6.1	4.2	11.9
Chinook salmon	0.3	2.9	6.1	9.3
Source: Clearwater BioStudies, Inc. 1999a				

Riparian habitat is comprised mostly of large conifers, with western red cedar (*Thuja plicata*) dominant, followed by grand fir (*Abies grandis*), spruce (*Picea spp.*), alder (*Alnus spp.*), willow (*Salix spp.*), and dogwood (*Cornus spp.*). Mixed shrubs, forbs, and grasses are subdominant along the creek.

3.2 Moose Creek

Table 9 provides a summary of aquatic habitat characteristics of Moose, Independence, and Deadwood creeks in the project area. Moose Creek habitat conditions vary; upstream from Deadwood Creek the stream has steep gradients and excellent fish habitat; between Deadwood and Independence creeks the gradient is moderately steep with habitat affected by past placer mining; between the Independence and Osier creeks the gradient is moderately steep to steep with habitat characteristics changing with changes in channel confinement; and downstream of Osier Creek Moose Creek has a wider floodplain, is more sinuous, and has a relatively flat stream gradient.

Independence Creek is moderately steep and dominated by large substrate, with sparse instream cover and moderate streambank cover. Deadwood Creek is steep with sparse instream and streambank cover conditions and the greatest amount of woody debris of all three streams.

Table 9. Summary of Aquatic Habitat Characteristics in the Project Area [a]			
Habitat Parameter	**Moose Creek**	**Independence Creek**	**Deadwood Creek**
Rosgen Classification	42% A, 45% B, 13% C	B3-B5 100%	A2/A3 100%
Average Gradient	4.8 %	3.2 %	5.5 %
Stream Width	8.2 m	2.8 m	3.0 m
Stream Depth	0.198 m	0.133 m	0.123 m
Thalweg Depth	0.38 m	0.255 m	0.236 m
Bank Stability [b]	4.4 (Stable)	4.5 (Stable)	4.8 (Stable)
Cobble Embeddedness [c]	22.5 %	33.5 %	25.3 %
Pool:Riffle Ratio [d]	9 : 59	15 : 51	25 : 63
Acting Debris / Potential Debris [e]	6 / 20	17 / 20	23 / 72
Pool Quality	1.5 (Poor)	1.6 (Poor)	1.0 (Poor)
Instream Cover	1.6 (Sparse)	1.5 (Sparse)	1.3 (Sparse)
Bank Cover	1.3 (Sparse)	2.1 (Moderate)	1.6 (Sparse)

a = Averages from 1990 summer stream survey (Clearwater Biostudies, Inc. 1991)
b = Largely due to abundant vegetation and large channel/bank substrate.
c = The target cobble embeddedness rate for the Forest Plan should be less than 35 %.
d = The target pool:riffle ratio is 40:60 for Rosgen B channels and 50:50 for C channels.
e = Acting debris = Pieces of in-channel wood per 100m. Potential debris = riparian conifers available for recruitment into the channel per 100 m. (Forest Plan recommends 40 pieces Acting and 80 pieces potential per 100 meters of stream)

Table 10 shows substrate composition in the Moose Creek drainage in the project area (Clearwater BioStudies, Inc. 1991).

Table 10. Average Percent (%) Substrate in the Moose Creek Project Area			
Size Category	**Moose Creek**	**Independence Creek**	**Deadwood Creek**
Bedrock	1.6	0	0
Boulders (>30.5 cm)	8.0	12.5	1.3
Large rubble (15.2 – 30.5 cm)	33.3	8.0	17.9
Small rubble (cobbles, 7.6 – 15.2 cm)	47.7	34.3	53.0
Coarse gravel (2.5 – 7.6 cm)	6.5	32.6	20.0
Small gravel (0.6 – 2.5 cm)	1.3	8.8	5.8
Sand (<0.6 cm)	1.1	2.4	2.0
Silt	0.2	0	0
Muck	0.1	0	0
Organic debris	0.2	1.6	0

Source: Clearwater Biostudies, Inc. 1991

Data indicate that cobble and rubble substrate dominates Moose Creek; coarse gravel and cobble dominate Independence and Deadwood creeks (Table 10). These substrate sizes provide some spawning habitat and substantial rearing habitat. Table 11 summarizes the average percentages of spawning habitat for resident salmonids in Moose Creek and its tributaries in the project area, based on the 1990 habitat survey. Data indicate a limited amount of available spawning for the three creeks.

Table 11. Percent of Moose Creek Project Area Available for Spawning [a]				
Fish	**Good**	**Fair**	**Poor**	**Total %**
Resident salmonid (spring)	0.13	0.16	0.07	0.36
Resident salmonid (fall)	0.11	0.12	0.05	0.28
a = Combined average for Moose Creek, Independence Creek, and Deadwood Creek based on habitat area. Source: Clearwater Biostudies, Inc. 1991				

Riparian habitat in Moose Creek varies considerably but is comprised mostly of mixed shrubs with an overstory of alder, spruce, and mixed conifer trees. However in Independence and Deadwood creeks, spruce, mixed conifers, and alder trees dominate. Along all the streams, mixed shrubs, forbs/grasses, and small alder were subdominant.

4.0 Analysis of Suction Dredging Effects on Fish and Wildlife

This section presents information on the impacts of small suction dredging operations to fish and wildlife resources.

4.1 Impacts to Fisheries

The total habitat area of Lolo Creek within the project area is 189,315 square meters (Clearwater BioStudies, Inc. 1999a). Because small suction dredges use nozzles from two to five inches in diameter, the substrate size fractions subject to entrainment range from silt fines to small rubble (3-5 inches diameter). These size fractions comprise about 99,036 square meters or 52 percent of the streambed in the Lolo Creek project area. Thus, a reasonable maximum level of disturbance by dredge operators could occur to about one-half of the aquatic substrate habitat.

There could be up to 18 proposed plans for operation in Lolo Creek. If 18 suction dredges operated the entire season, then the estimated total disturbance could reach 8 square meters of stream bottom per day for 46 days. This would result in 6480 square meters of direct disturbance (8 square meters x 18 operations x 46 days) during a season, which would represent about 7 percent (6480 ÷ 99,036) of aquatic habitat.[1]

Based on past dredging operations, potential maximum downstream measurable indirect effects from turbidity and sedimentation would occur within 100 meters (325 feet) of direct operations (based on research from Royer *et al.* 1999), so this would add another 9,000 square meters to the potentially disturbed area (100 meters length x 5 meters width x 18 operators). Thus, there could be indirect effects over about 9 percent of the aquatic habitat in Lolo Creek (9,000 ÷ 99,036). As noted in section 4.3.2, there is very little fine material (material <0.25 mm in diameter) in Lolo Creek and so the potential for added turbidity is relatively low. As a result, effects from turbidity would not occur in nearly this large an area.

When a similar approach is applied to the Moose Creek study area, up to 38 simultaneous dredge operators would impact approximately 80 percent of the aquatic substrate habitat. The maximum

[1] This is the maximum area that could be disturbed, but the area that is reasonably likely to be disturbed in any given year would be much smaller. In 2001, for example, there were only eight section dredge operations in Lolo Creek. Of these, only two dredged for close to a full season (46 days), while the other six were active for only one or two weeks.

area of potential direct disturbance would be about 16 percent of the available habitat area meeting substrate sizes, and about 12 percent of total aquatic habitat for potential indirect impacts.[2]

4.1.1 Direct Impacts to Fish

The window for dredging operations occurs from July 1 to August 15. This minimizes impacts to most larval and juvenile fish, and occurs after steelhead trout and bull trout emerge from the substrate.

Mortality and Injury. Salmonid alevins are the larval stage between the egg and the free-swimming fry or juvenile. They develop from eggs deposited in gravels of the redd. Dredge-related mortality of alevins can occur in three ways. First, they could be crushed underfoot when operators cross streams while moving in gear and mining equipment. Redds are typically located in shallow, flat gradient stream areas that afford good footing for those crossing a stream. Secondly, alevins could be entrained through the intake pipe. Entrainment could kill alevins immediately or cause injuries or stress that could cause delayed mortality (Griffith and Andrews 1981). Thirdly, debris tailings and fine sediment could be deposited on a redd, trapping or suffocating alevins from excess fine sediment deposition or oxygen depletion.

Another mortality factor would be fish eggs, larvae, and alevins that become entrained by small suction dredge operations. Griffith and Andrews (1981) found high mortality of entrained eggs of cutthroat trout before eye-up but mortality was less as eggs matured. Cutthroat trout sac fry suffered more than 80 percent mortality from suction dredging entrainment compared to a 9 percent natural mortality rate. They speculated that entrainment would likely kill larvae of other fish species and that eggs, larvae, and fry surviving entrainment could suffer from subsequent predation and stress. Juvenile and adult salmonids would likely avoid or survive passage through a suction dredge (Harvey and Lisle 1998). Post-emergent salmonids would also be vulnerable until they are large enough to avoid entrainment. Juvenile and adult salmonids would normally be able to avoid entrainment (Harvey *et al.* 1995).

Steelhead trout and chinook salmon would likely be most affected in Lolo Creek due to the potential for more spawning and egg deposition in areas that could be dredged (Section 3, Table 8). However, the likelihood of impacts are considered very low due to the small area of disturbance that may overlap with spawning habitat and the fact that suction dredging operations would not begin until most steelhead have emerged from the redds, and cease before most chinook spawn (July 1 through September 15). Suction dredge operations are only allowed to be located in areas of large substrate not preferred for spawning steelhead trout and bull trout. In addition, operators must meet with a Forest Service fisheries biologist who will inspect the site area for redds prior to commencement of dredging. Furthermore, to avoid fish entrainment, operators are required to use a 3/32 mesh screen for their intake hoses.

Disturbance and Dislocation. Suction dredging could disturb salmon holding in deep pools during summer, particularly if numerous dredges are operating or water temperatures are elevated (Somer and Hassler 1992).

Dredge piles that span the stream channel are not permitted, although some operators may create temporary partial barriers in order to increase flotation of their dredge in shallow areas of the creeks.

[2] Again, this is the maximum area, and again the actual area disturbed would be much less. In 2001, the Forest Service received 11 proposed plans of operations for Moose Creek, Independence Creek, and Deadwood Creek. Of these, only three dredged for the full season, while the rest dredged from a weekend or two up to several weeks.

Temporary dredge piles that span a substantial portion of the stream width could affect the normal feeding and escapement behavior for juvenile salmonids and other small fishes (Harvey and Lisle 1998). This could cause the affected fish to undergo stress and reduced vigor, or fall prey to predators. These temporary dredge piles would generally not persist through the normal peak flow events. When large amounts of substrate are deposited over cobble habitats, riffle sculpin (*Cottus gulosus*) could be displaced (Harvey 1986). Since cobble substrates are usually not limited in stream reaches of Lolo and Moose creeks, riffle sculpin could quickly disperse to new locations.

Suction dredging will dislocate and kill a small number of aquatic insects used as a food source by a variety of fish species and life stages (see Section 4.1.3). This would occur in the immediate vicinity of the suction dredge and fish in the local area would be forced to relocate to find food. Fish relocating to new feeding areas may experience increased stress due to predation, exposure to suboptimal habitat conditions, or increased competition with other fish.

Changes in Water Temperature. Elevated water temperature affects fish metabolism, development, and activity. It lowers the amount of oxygen available to fishes and can induce stress, disease, and mortality. Juvenile and resident salmonids are at risk when temperature exceeds 23-25 degrees Celsius (Spence *et al.* 1996).

The Proposed Action would not affect stream temperature beyond the actual site where suction dredging is occurring. Shade trees would not be cut and the width-to depth ratio of dredged channels would not be sufficiently increased to cause solar radiation to increase stream temperature. Pool temperature could be slightly reduced in excavated pools if cooler groundwater is intercepted or deepened pools cause stream flows to stratify. This effect would likewise have little influence on stream temperature beyond the immediate area of suction dredging operations. However, the influences of suction dredging in streams with elevated water temperatures could produce synergistic effects (USFS 2001).

Changes in Sediments and Turbidity. Fine sediment and turbidity would increase during dredging. In those areas where small amounts of fine sediment are being worked and stream flows are high, only small increases in turbidity would be detectable and the effects would be small and short duration. If large amounts of fine sediments are encountered and stream flows are low or moderate, detectable increases in turbidity would be expected at the site and could extend a hundred feet or more downstream.

Royer *et al.* (1999) evaluated effects from both 8-inch and 10-inch commercial suction dredge operations. They found that although turbidity and total filterable solids increased downstream of the dredge, the values returned to upstream levels within 80-160 m downstream of the dredge. Turbidity values for the 8-inch dredge were approximately 25 NTUs in the immediate area of suction dredging operations, but fell to less than 5 NTUs within 40 m downstream. Furthermore, the effect of the turbidity plume was limited to approximately 7 percent of the river width.

Research has found the feeding ability and health of sculpin and salmonids are not significantly impaired by the increased turbidity of suction dredging (Hassler *et* al. 1986). While significant increases in turbidity can stress juvenile salmonids, especially through gill irritation, it would not likely cause mortality (Bash *et al.* 2001). In areas of concentrated suction dredging, the amount of fine sediment deposition would be cumulative. Mobilized fine sediment would settle downstream within slow water velocity areas such as pools. It is unlikely enough fine sediment would be deposited to measurably reduce pool size. However, significant increases in deposited fine sediment could reduce overall habitat quality for salmonids by filling in of interstitial spaces used by juveniles

and by reducing the distribution, diversity, and abundance of benthic invertebrates used as prey items (Hassler *et al.* 1986). Fine sediment deposited during the operating season would likely be routed through the stream system during the normal peak flow event.

Fine sediment from vehicular travel on unimproved substandard access roads and trails and on hardened stream banks could be delivered to streams. However, the amounts would likely be small and not detectable.

The substrate sizes in Lolo Creek and Moose Creek are dominated by cobbles and boulders (Section 3, Tables 6 and 9) and large quantities of fines are not expected. In addition, suction dredging often targets bedrock cracks below the gravel/cobble layer where even fewer fines are located.

Chemical Contamination. Fuel, oil, and grease could be spilled into the creeks and affect aquatic resources. However, these products would be stored in areas that minimize the opportunity for accidental spillage into the stream. Refilling instream equipment is limited to one gallon at a time in the presence of absorbent material. Small amounts of grease, gasoline, and motor oil could be spilled into the stream during suction dredge operations and it is conceivable that a gallon or two could be spilled annually.

Some dredge operators camp for several weeks in undeveloped sites near streams without proper toilet facilities. Some water contamination could result from lack of proper toilet facilities (fecal coliform), improper disposal of garbage, and use of soap and detergents.

4.1.2 Impacts to Instream Habitat

Substrate. The proposed action does not limit the amount of substrate material that could be dredged in a particular claim or river segment, provided separate operators are at least 100 feet apart. Deposited substrate material could be piled or spread out. In addition, rock too large to pass through the dredge nozzle (generally greater than 5 inches) would typically be hand piled in or along the stream channel. These dredge piles and hand placed rock could deflect stream flows and cause localized scour and deposition. These larger substrate materials would have to be replaced in the dredge holes by the operators by August 15. In addition, the dredge piles of substrate would likely be scoured-out during normal high flow events, except in drought years.

Woody Debris. The proposed action does not allow instream wood (generally larger than six inches in diameter and three feet in length) to be removed or cut from the stream channel. Dredging of sediments could destabilize instream wood potentially reducing its stability and causing it to move from its natural location. Destabilizing instream wood could reduce pool frequency and quality and streambank stability.

Some operators may cut streamside shrubs or trees they feel pose a hazard to their operation. This could reduce stream shade. Felled trees recruited to stream systems would have less ability to form quality pool habitat than intact trees because they lack their stabilizing root wad.

Stream Channel Condition. Small suction dredging operations could increase pool frequency where dredging excavates pools and could decrease pool frequency where pools are filled by deposited tailings. An increase in pool frequency could temporarily improve stream channel diversity, a condition beneficial to many fishes and aquatic organisms. However, if excavated pools dry up during late summer, fish and aquatic organisms using them could become stranded and loose vigor or die from intolerable environmental conditions or succumb to predation. Dredge holes

(excavated pools) would likely be filled in during normal high flows except in small stream channels or during drought years. The proposed action calls for backfilling of all pools created.

Suction dredging could alter pool dimensions and quality; through excavation, dredge pile deposition, or changes in channel morphology. Excavating pools could substantially increase their depth and increase cool groundwater inflow. This could reduce pool temperature (Harvey and Lisle 1998). If pools were excavated to a depth greater than three feet, salmonid pool habitat could be improved. In addition, if excavated pools reduce pool temperatures, they could provide important coldwater habitats for salmonids living in streams with elevated temperatures. Deepened pools would likely return to their original depths following the high flow events.

Suction dredging is likely to occur in the main stream channel as there are very few potential off-channel habitats in the Lolo Creek and Moose Creek project areas. It is possible, although unlikely, that dredging piles could temporarily block off-channel habitats from the normal stream flow during the operating season. However, any off-channel habitats would be hydrologically restored during high flow events.

Suction dredging could locally alter the channel width/depth ratio. Where channels are excavated, depth is increased. Where tailings are deposited, the depth is decreased. However, it is unlikely small-scale suction dredging would change the width-to-depth ratio beyond the immediate area of operations because of the relatively small amount of stream channel that would be excavated or filled with tailings. Assuming a maximum width of 2 m for a dredge pile, this would be less than 25 percent of the average stream width of Lolo Creek and Moose Creek. The average stream widths for Independence and Deadwood creeks (in the Moose Creek project area) are about 3 meters.

Some dredge operators may build temporary rock barriers to facilitate flotation of dredges. These small barriers would usually be needed for a few hours to a few days. If properly constructed, they generally would not block adult fish passage but could inhibit normal juvenile salmonid feeding behavior and escapement from predators while in place.

Dredge tailings deposited in small streams reduce channel depth. This could inhibit upstream and downstream movement of aquatic organisms, including sculpins and juvenile salmonids (Harvey and Lisle 1998). Fish and other aquatic organisms could be denied access to important habitats needed for survival. Any stranded fish and other aquatic organisms would be vulnerable to mortality through predation or exposure to intolerable environmental conditions. These blockages would generally not persist through high flow events even if not dismantled after operations.

Bank Stability. Suction dredge piles could re-direct stream currents into stream banks and cause localized bank erosion. When large rock, boulders, and instream wood are dislodged from pools and along stream banks, stability could be reduced. Excavated pools near streambanks could cause eventual bank collapse and reduced stability. Hand piling of rock too large to pass through a dredge could redirect stream flows into banks causing localized bank erosion. However, if followed, operator guidelines should prevent destabilization of streambanks.

Some camping occurs in association with suction dredging. In some instances, entire families or groups of miners camp together for days to weeks at a single location. Since, some of the camping could occur along streambanks and outside of designated campgrounds, some destruction of riparian vegetation and hardening of streambanks could occur. Miners could collect firewood from within the stream recruitment zone and reduce wood available for stream bank stabilization and other stream processes.

Flow/Hydrology. No effects would be expected to existing peak and base flows of the affected creeks. Operators sometimes use poorly located and constructed roads and trails to access their claims. Roads and trails that lack proper drainage features (e.g. culverts and ditches) could intercept precipitation and stream flow and redirect water away from the normal drainage network. Many of these access roads and trails are not maintained or repaired by the Forest Service.

4.1.3 Impacts to Aquatic Invertebrates

The operation of small-scale suction dredges would be expected to displace some insects downstream but result in minimal amounts of injury or mortality to aquatic insects. Suction dredging effects on immature fish, aquatic insects, and other invertebrates were assessed in the Yankee Fork (tributary to the Salmon River near Stanley, Idaho) and Bums Creek (tributary to the South Fork Snake River) in 1980 by Griffith and Andrews (1981). They found that less than one percent of 3,623 macroinvertebrates entrained through a three-inch dredge nozzle displayed injuries or died within 24 hours. The mortality rates varied by species but were highest among emerging mayfly species. Most of the re-colonization of the dredged areas by aquatic invertebrates was complete after 38 days.

Exposure of previously buried substrate and covering of existing substrate can locally reduce abundance of benthic invertebrates. However, most aquatic invertebrates species have a life history capability of re-colonizing disturbed sites within several weeks.

Royer *et al.* (1999) found that the density of aquatic invertebrates was greatly reduced in the first 10 m below an 8-inch commercial suction dredge. The abundance and diversity of invertebrates returned to values seen at the upstream reference site within 80 to 160 m downstream of the dredge. The authors reported that recovery of invertebrate diversity appeared substantial within one year after dredging. Royer *et al.* (1999) also evaluated the impacts of small-scale recreational suction dredging on invertebrates approximately 5 weeks after dredging operations ended for the year. They found that aquatic invertebrate density, taxa richness, and EPT richness were not significantly different between the dredged areas, 35 m downstream, and the upstream reference sites. Where dredging moves substantial amounts of substrate occupied by aquatic mollusks, re-colonization would take much longer because of their low dispersal rates and limited distribution within river systems (Harvey and Lisle 1998).

Dislodged fine sediment would be distributed downstream of the dredged area and could temporally fill interstices in gravel and cobble, reducing available macroinvertebrate habitat in the immediate area. Scouring action during the next high flow would likely clear out sediment accumulations and allow aquatic insects to re-colonize the habitat. However, continued intensive dredging of multiple claims could cumulatively reduce the habitat quality over specific areas. Thomas (1985) reported significantly lower aquatic insect abundance in a 35-foot section of stream that had just been dredged, compared to a site downstream of the operation, although re-colonization was substantially complete within one month after the dredging.

4.1.4 Summary of Impacts to Threatened and Endangered Fish

Chinook Salmon. No impacts are expected to fall-run chinook salmon because the closest distance to fall-run essential fish habitat is over 25 miles downstream from the Lolo Creek project area, and over 100 miles from the Moose Creek project area due to the Dworshak dam that provides a complete barrier to anadromous fish migration.

Available spawning habitat for spring chinook salmon is approximately 1.1 percent of the aquatic habitat in the Lolo Creek project area (Section 3). Spring chinook salmon are supplemented by hatchery fish and there are sizable densities of chinook juveniles in Lolo Creek. The dredging operations work window occurs several months after spawning. Short-term impacts to juvenile chinook could occur during the dredging window. These impacts would be limited to displacement or avoidance during the hours of dredging activity and the localized reductions in macroinvertebrate food availability.

Steelhead Trout. The Lolo Creek steelhead population is a combination of natural and hatchery fish, and it produces very few natural steelhead due to poor adult returns and habitat conditions. Approximately 12 percent of Lolo Creek within the project area is available for steelhead trout spawning habitat, but less than 2 percent is considered good spawning habitat (Clearwater BioStudies, Inc. 1999a). The dredging operations work window occurs after most steelhead emerge from the substrate. Small-scale suction dredge operations will have a negligible impact on adult steelhead or their spawning gravels because spawning occurs 5 to 6 months later during spring flows that naturally redistribute the substrate, and after re-colonization of macroinvertebrates. Short-term impacts to juvenile steelhead trout could occur during the dredging window as fish are displaced away from dredging activity and from localized reductions in macroinvertebrate food availability.

The Biological Opinion for suction dredge mining in Lolo Creek (USFWS 2003) stated that the 18 projects proposed for 2003 suction dredging would not likely jeopardize the continued existence of the Snake River steelhead. Due to the natural redistribution of substrate and re-colonization of the dredge areas between August 15 and July 1 every year, the potential for cumulative impacts from many years of small-scale suction dredge operations are not anticipated.

As with chinook salmon, steelhead trout do not exist in the Moose Creek drainage due to the presence of Dworshak Dam.

Bull Trout. In the Lolo Creek project area, no bull trout have been identified since 1995, despite extensive fish surveys, and only 6 bull trout were identified from 570 survey stations in Lolo Creek starting in 1987. The window of suction dredge activity is during a period that minimizes the likelihood of bull trout being present or spawning in the project area. In August 2002, the U.S. Fish and Wildlife Service concurred with the Forest Service's determination that the small-scale suction dredging proposal for the 2002-2003 season may affect, but is not likely to adversely affect bull trout (USFWS 2002).

In the Moose Creek project area, bull trout presence has been documented by several sources, but bull trout numbers have been relatively low up to the year 2000. Between 1984 and 2001 bull trout were found at 7 out of 97 snorkeling stations. However, higher numbers of adult bull trout have been found in snorkeling surveys since 2000 (USFWS 2003). Moose Creek, proposed as critical habitat, has excellent for bull trout rearing but available for spawning habitat is less than one percent (Clearwater Biostudies, Inc. 1991). The impacts of small-scale suction dredging on bull trout eggs, alevins, or fry are expected to be minimal because bull trout hatch in January and February, and remain in the gravel until April or May; and leaving the gravel before the dredging work window. Disturbance to fry would be limited to short-term impacts that would occur during the dredging window, such as temporary displacement during the hours of dredging activity and localized reductions in macroinvertebrate food availability. The impacts to instream habitat conditions (discussed in Section 4.1) would be minimal, especially due to the existing and proposed

conservation measures required in permits for dredging operations that are discussed in Section 2.3 of the companion draft EIS.

Westslope Cutthroat Trout. Impacts to cutthroat trout would be similar to those for steelhead trout and bull trout mentioned above. Cutthroat trout populations are higher relative to steelhead and bull trout and much of their spawning habitat is in the small tributary streams.

4.2 Impacts to Wildlife

The impact of suction dredging on terrestrial wildlife is focused predominately within the riparian zone and in the operational sites (including camps) along the streams. Aquatic amphibians (e.g., boreal toad) can be affected through entrainment of eggs and young in the early stages of development. Existing permit restrictions prohibit suction dredging into the banks of streams that could potentially cover amphibian eggs and preferred habitat. The permit stipulations also prohibit damage to riparian habitat, which is used extensively by amphibians.

Terrestrial species, including most birds, mammals, reptiles and some amphibians are not likely to be adversely impacted by suction dredging, although they may be disturbed by the activities (primarily from equipment noise and camp activities) to the point where they temporarily abandon some areas of preferred habitat. Large animals frequenting riparian areas have relatively spacious territories, and will simply avoid the dredging sites. For example, suction dredging activity may prevent an aquatic fur bearer from foraging in the area, but other nearby sites are likely to be available within its territory.

Existing permit conditions provide substantial protection for vegetation habitat along streams. This provides for long-term wildlife use of the area, especially during 10 months of each year when dredging operations are not allowed.

Impacts to threatened, endangered, or sensitive wildlife species are considered negligible. For example, dredging activities would not occur during the winter months when bald eagles may winter along the Clearwater River. Additionally, grizzly bear, lynx, and gray wolves are not known to inhabit the project areas. For at least 10 months of the year, the temporary noise and other human impacts associated with small-scale dredging would not likely jeopardize the continued existence of the gray wolf (USFWS 2002), and would result in no adverse effect on bald eagles, grizzly bear, lynx, or their habitats (USFS 2002a,b).

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Appendix C

Past, Present and Foreseeable Actions

Lolo Drainage

Past Timber Harvesting Above Musselshell in the Lolo Drainage

TRS	Timber Sale	Drainage	Estimated Treatment Acres	Year Completed
T34N, R6E, Sec 4, 33	April Cr. #2	April	18	1973
T34N, R6E, Sec 5, 6, 7, 8	Lowboy	Brady Nevada	199	1989
T35N, R6E, Sec 2, 3 T36N, R6E, Sec 25, 26, 34, 35, 36	Dutchman salvage	Dutchman	138	2002
T35N, R6E, Sec 2, 3, 10 T36N, R6E, Sec 26, 34, 35, 36	Dutchman	Dutchman	841	1986-1987
T35N, R6E, Sec 2, 3, 4, 26, 34, 35, 36	Pioneer Mine	Dutchman	1030	1977-1981
T35N, R6E, Sec 3	Gold Cr #2	Dutchman	180	1981
T35N, R6E, Sec 3, 4	Pioneer Gold Salvage	Dutchman	20	1981
T35N, R6E, Sec 3, 4 T36N, R6E, Sec 26, 34, 35	New Pioneer OSR	Dutchman	582	1994
T36N, R6E, Sec 26, 34	Johnson Gold	Dutchman	34	2002
T36N, R6E, Sec 26, 35, 36	Flying Dutchman Salvage	Dutchman	28	1998
T36N, R6E, Sec 34	Last Chance	Dutchman	138	1986
T36N, R6E, Sec 35	Old Pioneer	Dutchman	33	1982
T35N, R7E, Sec 3, 4	Knoll Cr Bugs	Knoll	60	2003
T34N, R6E, Sec 5, 6	Section 6 WP	Lolo	40	1981
T34N, R6E, Sec 5, 8, 9	Brady Cr. OSR	Lolo	108	1974-1977
T35N, R6E, Sec 1, 2 T36N, R6E, Sec 36	Upper Lolo OSR	Lolo	197	1983-1986
T35N, R6E, Sec 10, 15	Lucky 10 Pulp	Lolo	138	1991
T35N, R6E, Sec 17, 20, 21, 22, 28, 29	Lolo Forks	Lolo	2526	1977-1992
T35N, R6E, Sec 17,20	Big Slide	Lolo	33	1974-1976
T35N, R6E, Sec 20, 21, 28, 29	Big Fill CP SSTS	Lolo	16	1981
T35N, R6E, Sec 20, 21, 28, 29	Zahn's Houselog	Lolo	16	1981
T36N, R7E, Sec 30	Upper Lolo #1	Lolo	12	1975
T35N, R6E, Sec 15, 16, 17, 28, 29, 33	Burnt Salvage	Lolo, Utah, Nevada, Mike White, White	194	1985
T35N, R6E, Sec 1, 2, 11, 12, T36N, R6E, Sec 25, 35, 36 T36N, R7E, Sec 30, 31	Relaskop Salvage	Lolo Yoosa	1256	1999

Lolo Drainage

Past Timber Harvesting Above Musselshell in the Lolo Drainage

TRS	Timber Sale	Drainage	Estimated Treatment Acres	Year Completed
T35N, R6E, Sec 10, 15, 22	Lolo Chamook	Lolo Yoosa	355	1994
T35N, R7E, Sec 4, 5, 6 T36N, R7E, Sec 29, 31, 32, 33, 34	Lolo Yoosa	Lolo Yoosa	512	1993-1995
T35N, R6E, Sec 28, 29, 33, 34	Mike White	Mike White	737	1984-1985
T35N, R6E, Sec 28, 29	5028 Salvage	Mike White White	28	2002
T35N, R6E, Sec 4, 5	Nevada Cr. WP	Nevada	60	1972
T35N, R6E, Sec 2, 3 ,9,10, 11, 16, 17, 20	Siberia #2	Siberia	404	1991-1992
T36N, R6E, Sec 34, 35	Little Red Salvage	Siberia	47	1987
T34N, R6E, Sec 4, 5 T35N, R6E, Sec 28, 32, 33, 34	Deer Utah	Utah	401	1991-1995
T35N, R6E, Sec 5, 29-33	Utah Creek	Utah	1248	1959-1966
T35N, R6E, Sec 21	White Cr. #2	White	1030	1983-1984
T35N, R6E, Sec 21, 28, 29, 32, 33, 34	White Salvage	White	436	1998
T35N, R6E, Sec 1	Chamook CP	Yoosa	24	1970
T35N, R6E, Sec 1 T35N, R7E, Sec 6 T36N, R7E, Sec 31	Dead End Poles	Yoosa	148	1983-1985
T35N, R6E, Sec 1, 10, 11, 12, 15 T35N, R7E, Sec 6 T36N, R6E, Sec 36	Chamook Cr	Yoosa	393	1960
T35N, R6E, Sec 1, 12 T35N, R7E, Sec 6, 7	Relaskop Cr	Yoosa	509	1978-1981
T35N, R6E, Sec 1, 12 T35N, R7E, Sec 7	Releskop Pulp	Yoosa	210	1984
T35N, R6E, Sec 1, 2 T36N, R6E, Sec 35 T36N, R6E, Sec 36	Deadwood	Yoosa	132	1983
T35N, R6E, Sec 1, 2, 10, 11, 12 T35N, R7E, Sec 6	Camp Cr. WP	Yoosa	2191	1978-1979
T35N, R6E, Sec 1, 5, 6, 8	Bess Middle Yoosa	Yoosa	638	1972 - 1978
T35N, R6E, Sec 10, 11, 14, 15, 22, 23, 27	Austin-Chamook BD	Yoosa	270	1984
T35N, R6E, Sec 10, 15	Chamook Ridge	Yoosa	204	1979
T35N, R6E, Sec 11, 12, 13, 14, 23, 24	Mox Cr	Yoosa	1321	1983-1985
T35N, R6E, Sec 11, 14, 15, 22	Mox Remains	Yoosa	260	1995-1996

Lolo Drainage

Past Timber Harvesting Above Musselshell in the Lolo Drainage

TRS	Timber Sale	Drainage	Estimated Treatment Acres	Year Completed
T35N, R6E, Sec 12 T35N, R7E, Sec 5, 6, 7,8	Prism Cr.	Yoosa	480	1987-1988
T35N, R6E, Sec 13, 23, 24	Austin R/W	Yoosa	41	1980
T35N, R6E, Sec 15	Easy Pickens Pulp	Yoosa	12	1983
T35N, R6E, Sec 15, 22, 23	Cedar Chamook Salvage	Yoosa	18	1999
T35N, R6E, Sec 22	McClusky Cuttoff	Yoosa	292	1981-1982
T35N, R6E, Sec 22, 27	Big Mac OSR	Yoosa	180	1991
T35N, R6E, Sec 23	Lookout #1	Yoosa	70	1974
T35N, R6E, Sec 23	Lookout #2	Yoosa	12	1979
T35N, R6E, Sec 23	Aussie CP SSTS	Yoosa	216	1983
T35N, R6E, Sec 23	April Cr OSR	Yoosa	36	1983
T35N, R6E, Sec 23	Lookout Chawapiti	Yoosa	59	1991
T35N, R6E, Sec 23	Austin Salvage	Yoosa	39	2002
T35N, R6E, Sec 27, 28, 33,	Cham Hi-Risk	Yoosa	155	1976
T35N, R6E, Sec 3, 4	Camp CP	Yoosa	65	1983
T35N, R7E, Sec 3, 4, 5, 8, 9 T36N, R7E, Sec 34	Knoll Cr	Yoosa	774	1984-1985
T35N, R7E, Sec 5, 6 T36N, R7E, Sec 31, 32	Tray Cr	Yoosa	460	1981
T35N, R7E, Sec 7, 8	Prism Cedar	Yoosa	4	1991
T36N, R7E, Sec 29, 30, 31, 32	Snowy Camp	Yoosa	354	1987
	*** TOTAL ACRES TREATED**		**22662**	

* Total acres treated are the cumulative result of multiple entries.

Present & Foreseeable Timber Harvesting Above Musselshell in the Lolo Drainage

TRS	Timber Sale	Drainage	Estimated Treatment Acres	Year Proposed
T35N, R6E, Sec 9, 10, 14, 15, 16, 17, 20, 21, 22, 23, 28, 29, 32, 33 T36N, R6E, Sec 4, 5	White White TS	Lolo	7,000 ac	Planned 2007-
T35N, R6E, Sec 35; T35N, R6E, Sec 2	Pioneer Thinning	Lolo	< 70 ac	Planned 2007

Past Decommissioned Roads or Replaced Culverts in Lolo Drainage above Musselshell

TRS	Project	Drainage	Action	Year Completed	Miles
T35N, R6E, Sec 22	Chamook Creek	Yoosa	Fish Passage Culvert installed	2001	
T35N, R6E, Sec 15	Mox Creek	Yoosa	Fish Passage Culvert installed	2001	
T34N, R6E, Sec 5	Nevada Creek	Lolo	Fish Passage Culvert installed	2004	
T35N, R6E, Sec 16, 17, 20	Road No. 5136	Lolo	Decommission	2004	1.7
T35N, R6E, Sec 20	Road No. 73035	Lolo	Decommission	2004	0.4
T35N, R6E, Sec 16	Road No. 805131	Lolo	Decommission	2004	0.2
T35N, R6E, Sec 16, 20	Road No. 805116	Lolo	Decommission	2004	0.3
	TOTAL MILES OF ROADS DECOMMISSIONED				**2.6**

Culvert Removal and Road Decommissioning Projects for 2005

TRS	Project	Drainage	Action	Proposed Completion	Miles
T36N, R6E, Sec 24	Lolo Creek	Lolo	Fish Passage Culvert install	2005	
T36N, R6E, Sec 24	Belle Creek	Lolo	Fish Passage Culvert install	2005	
T34N, R6E, Sec 33	Nevada Creek	Lolo	Fish Passage Culvert install	2005	
T35N, R6E, Sec 29	Lolo Trib	Lolo	Fish Passage Culvert install	2005	
T35N, R6E, Sec 16	Lolo Trib	Lolo	Fish Passage Culvert install	2005	
T35N, R6E, Sec 27	Road No. 523B	Yoosa	Decommission	2005	0.95
T34N, R6E, Sec 5	Road No. 5133	Nevada	Decommission	2005	1.2
T34N, R6E, Sec 5	Road No. 73038	Nevada	Decommission	2005	0.4
	TOTAL MILES OF PROPOSED ROAD DECOMMISSIONING				**2.55**

Reasonably Foreseeable Culvert Removal and Road Decommissioning Projects

TRS	Project	Drainage	Action	Proposed Completion	Miles
T35N, R6E, Sec 9, 10,	White White TS Project Area	Lolo	Decommission	Planned	20.4
14, 15, 16, 17, 20, 21, 22, 23, 28, 29, 32, 33	White White TS Project Area	Lolo	Intermittent Storage	Planned	14.9
T36N, R6E Sec 4, 5	White White TS Project Area	Lolo	Culvert Replacement/Rem	Planned	14 river miles

			oval (8)		

Other Present and Reasonably Foreseeable Projects

Location	Project	Drainage	Proposed Completion	Acres or Miles
Lolo	Cattle Grazing	Lolo	Ongoing	Tbd
Lolo Drainage Above Musselshell	Routine road maintenance	Lolo	Ongoing	24 miles
Lolo Drainage Above Musselshell	Lewis & Clark Bicentennial - Increased visitors through 2006	Lolo	Through 2006	n/a

Past, Present & Foreseeable Mining Activities in the Lolo Drainage above Musselshell

TRS	Mining Project	Drainage	Estimated Acres	Year
T35N, R6E, Sec 32	Drag line Placer Mining	Lolo Creek	2	Pre 1940
T35N, R6E, Sec 32	Lolo #5 Placer Mining	Lolo Creek	2	1974-1979
T35N, R6E, Sec 3	Pioneer Mine Waste Pile Exploration	Dutchman	0.1	Ongoing

Moose Creek Drainage

Past Harvesting - Moose Drainage

TRS	Timber Sale	Drainage	Estimated Treatment Acres	Year Completed
T40N, R10E, Sec 13, 24 25 T40N, R11E, Sec 16-23 & 26-30	Cedar-Trout	Deadwood, Independence, Osier	2681	1958-1967, 1976, 1978, 1983
T40N, R11E, Sec 8, 9, 10, 15, 16, 21, 22	China-Osier	Osier	806	1972-1977
T40N, R10E, Sec 13, 14, 23, 24, 25 T40N, R11E, Sec 30, 31	Deadwood	Deadwood	537	1967-1979
T40N, R11E, Sec 20	Deception Saddle	Osier	13	1981
T40N, R11E, Sec 10, 15, 16, 21	East Osier Salvage	Osier	86	1975-1982
T40N, R11E, Sec 19, 20, 29	Independence Creek	Independence	54	1972-1978
T40N, R11E, Sec 8, 9, 10, 15, 16, 21, 22	Independent Moose	Independence	367	1980-1981
T40N, R11E, Sec 12, 26, 27, 34	Laundry Ridge	Osier	46	1981
T40N, R11E, Sec 23	Laundry Salvage	Osier	59	2000
T40N, R11E, Sec 22, 23 26, 27, 34, 35	Overlook	Osier	255	1981-1985

T40N, R11E, Sec 3, 4, 8, 9, 10, 11, 13, 14, 15, 23	Pre-Exchange Harvest Champion/DAW Lands	Osier	3360	1958-1968 1969-1979 1980-1988
	TOTAL ACRES TREATED		**8264**	

Past Mining Projects - Moose Drainage

Location	Project	Drainage	Estimated Acres	Year
T40N, R11E, Sec 5	Lilly Placer Dragline mining	Moose	30	1957
T40N, R11E, Sec 29	Black Bear Exploration	Independence	0.5	1988
T40N, R11E, Sec 17	G and G Mining	Osier	0.5	1988

Present and Foreseeable Projects - Moose Drainage

Location	Project	Drainage	Estimated Treatment Acres	Year
FS Road 255	Routine road maintenance	Moose	19 miles	Ongoing
T40N, R12E, Sec 31	Pollock Ridge Fuels	Osier	6000	2005
T40N, R11E, Sec 20	Crawford Mining Exploration	Osier	0.2	2007
Tbd	North Fork Noxious Weeds Treatment	Moose	Tbd	2006
T39N, R11E, Sec 29	Independence Thinning	Moose	70	2006

APPENDIX D

COMMENTS AND RESPONSES

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On April 2, 2004, the Environmental Protection Agency published a notice in the Federal Register (Volume 69, Number 64, page 17405-17406) announcing the availability of the Draft EIS. Clearwater National Forest issued a press release on April 13 and published a notice in the Lewiston Tribune, Idaho on April 4, that announced the availability of the Draft EIS and invited comments from the public on the document. The notices stated the comment period on the Draft EIS would extend through May 17, 2004. The Draft EIS was also made available for public review on the Clearwater National Forest website, http://www.fs.fed.us/r1/clearwater/Projects/Dredge/dredge.htm, and interested parties could submit comments through e-mail, written letter, or telephone conversation.

This appendix identifies the commenters; presents comments received by the public; agencies and organizations; and describes the Forest Service responses to these comments. These comments were used to make changes into the Final EIS (hereafter referred to as EIS in the response to comments).

A total of 11 individuals, organizations, and agencies submitted comments during the public comment period. The Forest Service carefully reviewed each comment received on the Draft EIS and organized them by 1) agency, and 2) individuals, alphabetically. Then, the Forest Service reviewed the letters for content to capture the public's concern and assigned a comment number to facilitate the organization of responses. Table D-1 identifies the individuals, organizations, or agencies that provided oral or written comments. This table also lists the number assigned to each separate comment. Table D-2 presents each the individual comments and the USACE responses to these comments.

Following Table D-2, comment letters and e-mails received are presented.

Table D-1. Individual and Organizational Commenters on the Draft EIS

Commenter	*Name of individual / organization submitting comments*
1	Judith Leckrone Lee, U.S. Environmental Protection Agency (letter dated June 10, 2004)
2	Preston Sleeger, U.S. Department of the Interior (letter dated May 11, 2004)
3	Cal Groen, Idaho Fish & Game (letter dated May 17, 2004)
4	Anthony D. Johnson, Chairman, Nez Perce Tribal Council (letter dated May 12, 2004)
5	Gary McFarlane, Friends of the Clearwater and other organizations (letter dated May 17, 2004)
6	Lynn Card (letter dated April 16, 2004)
7	Del DuPont (letter via e-mail dated April 21, 2004)
8	Ron Hartig (verbal, via telephone, May 17, 2004)
9	Bernie W. Janes (letter dated April 3, 2004)
10	Rod Neumann (letter dated April 12, 2004)
11	Larry Yount (letter dated April 16, 2004)
12	Larry Yount (e-mail dated April 18, 2004)

Table D-2. Comments on the Draft EIS and Forest Service Responses

Commenter #	Comment	Response
General Comment		
2-1	The Department of the Interior does not have any comments to offer. We appreciate the offer to comment.	Thank you for your comment.
Purpose and Need (Chapter 1)		
5-1	The scoping letter indicated that this proposal covered 16 proposals in Lolo Creek and 13 in Moose Creek. Now, the DEIS says it apparently covers 17 claims on Lolo Creek and 26 on Moose Creek. Why the change?	The scoping letter was based on what the Forest Service believed to be the maximum number of operations that could reasonably be expected in the respective creeks. Following scoping, the Forest Service consulted with BLM and determined that there are 17 mining claims on Lolo Creek and 26 on Moose Creek. Ownership of individual claims varies from 1 to 8 people. There are 18 people owning 17 mining claims on Lolo Creek, and 38 people owning 26 claims on Moose Creek. Using these figures, the absolute maximum that could be expected is 18 operations on Lolo Creek and 38 operations on Moose Creek. As noted in the EIS, there generally are far fewer operations than these numbers suggest.
5-2	Does this DEIS cover any proposal for suction dredge mining in the area covered by the analysis? There is still no clear indication whether suction dredging could occur in other streams. That is particularly true of the Moose Creek proposals which flow into Kelly Creek and then the North Fork Clearwater. The Big Game Habitat Restoration and a Watershed Scale (BHROWS) document indicate that the North Fork, from Kelly Creek to Beaver Creek, and all of its tributaries in that section, except Weitas Creek, are open to suction dredging. These pose a major threat to water quality and fisheries.	This EIS covers only suction dredging that occurs in portions of Moose Creek (including tributaries Independence and Deadwood Creeks) and Lolo Creek. Actions or activities that occur outside the project area such as in the North Fork Clearwater River from Kelly Creek to Beaver Creek and including all tributaries for those sections are beyond the scope of this analysis. Surface impacts and impacts to threatened fish from operations occurring outside the project area would be analyzed in a separate analysis and Endangered Species Act consultation.
5-3	... the refusal to do separate NEPA analysis for each proposal not only fails to comply with NEPA's requirements for site-specific analysis, it adds considerable confusion to the process. The District Ranger could approve suction dredge mining years after completion of this EIS without any NEPA analysis at all. It seems that in order to review this decision at higher levels, citizens who own the national forest would be required to challenge this document. Yet, the DEIS notes any ROD emanating from this EIS would not approve any proposed action (p. 2-9). A clearer statement of policy is needed as it appears many decision memos or other non-challengeable decisions would emanate from this EIS and no ROD would be prepared. Is that accurate? If so, it violates not only NEPA but the Appeal Reform Act as well.	The Forest Service believes that the analysis in this EIS is sufficient for the types and numbers of operations evaluated, and that separate NEPA analyses for each operation are not necessary. As stated in the EIS, the ROD for this EIS would not blanket approve plans of operations. Rather, it would allow the Forest Service to approve a limited number of individual plans if they met specified criteria.
5-4	The DEIS is unclear whether the current plans of operations (POOs) are sufficient to meet the requirements of the DEIS proposed on page 2-27. The FOIA response sent to Friends of the Clearwater indicates none of the POOs explicitly mention the 30 conditions in the DEIS. Does the	The operators who submitted the plans of operations will need to amend their individual plan to contain the conditions or to submit a new plan. The Forest Service will require each operator to submit a proposed plan of operations for each mining year. The Forest Service will approve a limited

Table D-2. Comments on the Draft EIS and Forest Service Responses

Commenter #	Comment	Response
	agency maintain that new POOs will need to be submitted before allowing suction dredging to occur?	number of operations. Each operation must agree to specific conditions/mitigation measures listed in the ROD.
5-5	It also seems some of the proposed dredge sites (see figure 2-4) are within the Moose Mountain Roadless Area (see Clearwater Forest Plan Appendices, C-102). This fact is overlooked in the DEIS. Since Deadwood Creek is the boundary of the roadless area, Lobo, Golden Goose, MAC 1, PB 1, and Katerons Folly, appear within the inventoried roadless area.	Lobo, Golden Goose, MAC 1, PB 1, and Katerons Folly are mining claims located in the Moose Mountain Roadless Area. Of the five claims, only the owner of Katerons Folly, MAC 1, and PB1 submitted an operating plan proposing to suction dredge in 2002. No proposals have been received from the Lobo or Golden Goose claimants at this time. The operators of all mining operations are entitled to access in roadless areas. However, access for suction dredge operations will be restricted to existing Forest system roads and trails.
6-1	I agree gold is needed. A quick look at the spot metals market shows gold at or near record levels. If they can't make money mining now they probably never will. Prospecting is needed to confirm that there is commercial quantities of gold present to mine. The high value of gold also presents a opportunity to restore, reclaim and repair past mistakes.	Thank you for your comment
6-2	For the most part this is recreational mining. This is a valued use of national forest and part of multiple-use. Just like hunting, fishing, back-packing or skiing. This keeps people especially retired people occupied and busy.	Thank you for your comment. As described in the EIS (Chapter 1), the Forest Service agrees that this is a valued use of Forest Service lands.
Proposed Action and Alternatives (Chapter 2)		
1-1	*Page 1-11* To further minimize the impacts from suction dredge operations, other Alternatives which the USFS might want to consider include limiting the number of operations on each stream, limiting the number which could operate at any given time, further limiting the size of dredge or hours/day in which they could operate, or simply limiting the amount of material each dredge could process. The lack of site specific data makes it particularly difficult to evaluate dredge impacts. One option the USFS may want to consider is to allow only a very limited number of dredges to be operated in each of these streams in the next few years. During that time detailed monitoring could be carried out to better evaluate impacts from these facilities. This would allow some of the operators to resume mining, would provide the USFS better information on which to evaluate and possibly permit other facilities, and could provide very useful information for the upcoming TMDL and NPDES permitting process.	The alternatives, allowed dates of operation, and terms and conditions include State of Idaho BMPs, and the reasonable and prudent measures listed in the Biological Opinions prepared by NOAA Fisheries (2003, 2004, 2006) and USFWS (2003, 2004, 2006). The Forest Service added additional elements based on concerns raised during consultation with the Tribe and other government agencies, public scoping, and based on the agencies past experience in preventing, minimizing, or mitigating impacts from dredging activities. The EIS considers up to 18 operators in Lolo Creek and 38 operators in Moose Creek, which is a very conservative estimate of the maximum number of operations. Operators have the right under both the 1872 Mining Law and the 1897 Organic Act to enter upon National Forests and to conduct upon these lands reasonable activities to prospect and explore for mineral resources. The Forest Service will not approve plans of operations unless they are covered by an NPDES permit. NPDES permits would have to be brought into compliance with TMDL requirements when it is developed.
1-2	The EIS should state who will conduct the restoration in Alternative 3.	The EIS has been modified to state that the Forest Service will implement

Table D-2. Comments on the Draft EIS and Forest Service Responses

Commenter #	Comment	Response
		the restoration projects.
3-1	Preferred Alternative: Three Alternatives were considered; No Action, Suction Dredging, and Dredge Mining and Stream Improvement Projects. IDFG supports your selection of Alternative 3 as the Preferred Alternative, which would permit dredging under stringent controls outlined in the Terms and Conditions, and includes some watershed restoration as well...	Thank you for your comment.
5-6	A major purpose of NEPA is to evaluate a reasonable range of alternatives. However, the DEIS ducks this issue by failing to look at an alternative that withdraws the habitat for listed species from mineral entry (DEIS page 2-9). The agency cannot so narrowly define the purpose and need as to preclude a meaningful analysis of other alternatives.	An alternative withdrawing all lands within the Moose and Lolo Creek project areas was discussed, but rejected. Withdrawing the lands involved in this EIS would not satisfy the Purpose and Need, which is to develop operating conditions and mitigation measures that protect surface resources, including threatened fish species, from impacts of suction dredging; and allow the Forest Service to approve, with no further NEPA analysis, a limited number of Plans of Operations in specified reaches of Lolo Creek, Moose creek, Independence Creek and Deadwood Creek.
5-7	...The DEIS erroneously asserts that mining claim validity is not an important issue (page 2-11)... The full text of this comment is found in the comment letter dated May 17, 2004 from Gary McFarlane, Friends of the Clearwater and other organizations. The full text is presented with comment letters in the FEIS Appendix D.	The citation was inadvertently omitted from the references cited. This has been corrected in the final EIS. Mining claim validity is not an issue in this environmental analysis. The normal procedure for the Forest Service is to review the plan of operation without investigating claim validity, other than to check land status for withdrawals or special designations. There is no requirement in Forest Service Regulations and policy for mining operations (prospecting, exploration, development, or production) to occur on a mining claim (36 CFR 228.3(a)). Further, if an operation does occur on a mining claim, the claim need not be found "valid" under the mining laws prior to operation. While the government may at any time question a claim's validity, there is no need to do so if the surface use activities are consistent with the Clearwater National Forest Plan direction, Forest Service policy, regulations, and the mining law. The September 2003 Memorandum from Mark Ray, USDA Undersecretary for Natural Resources and Environment to Dale Bosworth, Chief of the Forest Service outlining Forest Service Policy regarding mining claim validity is provided as Attachment 2 to these comment responses.
7-1	I do support alternative 3.	Thank you for your comment.
10-1	I go along with Alternative 3....don't see any problems.	Thank you for your comment.

Table D-2. Comments on the Draft EIS and Forest Service Responses

Commenter #	Comment	Response
12-1	...I support Alternative 3...	Thank you for your comment.
Terms and Conditions of Approval (Chapter 2)		
1-3	EPA generally supports the terms and conditions for dredging and we believe they are designed to protect fish habitat and seem to minimize the potential to damage stream channels and banks. EPA supports the provisions that the Forest Service has developed regarding timing and locations for dredge operations to minimize disruption of aquatic habitat. Also, we support the proposed monitoring discussed in the EIS that the Forest Service will conduct.	Thank you for your comment.
1-4	Condition 4 states that if streambanks are disturbed, they must be restored but it isn't until Condition 10 that it says that streambanks shouldn't be disturbed at all. These 2 conditions should be one after the other with #10 first.	The order of the conditions has been changed as suggested by the commenter.
1-5, 3-2	Condition 12 says that operators have to maintain a 100 foot separation distance but Condition 15 says that they have to visually monitor 300 feet downstream. The EIS should explain how the 300 foot distance will be determined by the operators. It would seem that it would be difficult to discern between one operator's turbidity plume and another's. For example, what if one dredger were operating and his turbidity plume disappeared within 100 feet but another dredger was operating 110 feet away and had a turbidity plume 300 feet long - it would still be within the first dredgers 300 feet but he would have no control over it. It would seem that the length of the monitored reach should be the same as the spacing distance between dredges.	As former condition 15 (DEIS) (currently EIS, Section 2.1, condition 21) states, "...if noticeable turbidity is observed downstream, the operation must cease immediately or decrease intensity until no increase in turbidity is observed 300 feet downstream. This condition would require any operation, regardless of spacing, to shut down or decrease intensity, if the stream becomes turbid from upstream activity.
1-6	The EIS should explain what happens if conditions are found that were not expected. There are at least a couple of possibilities here. One possibility is that an operator does not abide by the agreed-upon conditions. The EIS states that the Plan of Operations will not be renewed the following year. Is there an option to withdraw the permission mid-season? A second possibility is that while all operators abide by the conditions, the amount of disturbance is greater than predicted for some reason. The EIS should consider these scenarios and have a contingency plan in order to be prepared for unforeseen circumstances.	Once a plan of operations is approved, the operator is required to conduct the operation in accordance with the approved plan. This includes the amount of disturbance and the terms and conditions listed in chapter 2. If a violation of the approved operating plan is discovered, the Forest Service is required to follow non-compliance procedure outlined in its regulations at 36 CFR 228.7, and if necessary, seek civil or criminal penalty. Other State and Federal agencies will be also be notified of the non-compliance. If unforeseen circumstances do occur, then the approving officer will follow the procedure outlined in regulations at 36 CFR 228.4, which requires modification of the existing plan. Consultation with the appropriate service would also be reinitiated and the modification would have to be analyzed for environmental impacts.
1-7	EPA supports the commitment by the Forest Service to conduct five inspections during the season and to do a final evaluation at the end of	Thank you for your comment.

Table D-2. Comments on the Draft EIS and Forest Service Responses

Commenter #	Comment	Response
	the season. This provides important assurance that any impacts that do occur are not likely to go unnoticed.	
1-8	The EIS states that streams will be restored to original condition by the end of the field season. The EIS should explain how this will be evaluated and how the operators or Forest Service will determine if the next pool downstream has been reduced in volume?	Operations will be inspected by the Forest Service at least 5 times during the approximate 6-week time period where dredging would be allowed. Inspections for impacts to channel geomorphology, including upstream and downstream pool/riffle sequences, will follow the methods specified in the NOAA Fisheries Biological Opinion (2006, pp 7-8) "Monitor changes in stream morphology...at the mining site, and in the pool/riffle sequences immediately upstream and downstream from the mined area, before and after mining: (1) Wolman pebble counts; (2) channel cross-sections; (3) one longitudinal profile; and (4) pictures showing the location of ...features such as large woody debris, boulders, [and] bank condition." The Forest Service will also implement USFWS Biological Opinion (2006, p.25) conservation recommendation 5, "Collect necessary data to update Matrix of Pathways and Indicators for Moose Creek." Following each mining season, the Forest Service will report the results of post-season monitoring to NOAA Fisheries and USFWS. (See EIS, Chapter 2).
1-9	... the EIS should explain how any pools deepened by dredging will be filled back to the original level.	Pools are generally not dredged, as operators typically target rough, highly fractured bedrock; low-velocity deposition sumps above resistant outcrops, dikes or faults; and boulder concentrations or coarse lag gravels on bedrock. The terms and conditions, however, specify that dredges must operate in areas of large substrate (EIS, Section 2.1.2, T&C 6), they cannot operate in gravel bar areas at the tails of pools (T&C 19) and they may not operate in such a way that sediment from dredge discharge blankets gravel bars (T&C 20). Operators generally fill the holes they create by directing the sluice outfall into the previously dredged hole. The sluice outfall then backfills the dredge hole. Any cobble or small boulders previously removed are then returned to the hole and blended with the surrounding substrate. The morphology of sites will be monitored by the methods described in response to comment 1-28.
3-3	Provisions for protecting fish and aquatic habitat are addressed in the "Terms and Conditions"(EIS 2.2 to 2.7) that will be required of all dredge operators. We believe that the required "Terms and Conditions" for operations will be generally protective of bull trout and steelhead, if adequately implemented and enforced. However, we do have some concerns about those Terms and Conditions. In particular, we are concerned that the protections are limited to those species. The Terms and Conditions (except the additional Terms and Conditions under Alternatives 2 and 3, which are intended to meet ESA requirements) should also extend protections to other species, especially Chinook salmon, westslope cutthroat trout and Pacific lamprey. Our comments	The Forest Service agrees that the terms and conditions will protect bull trout and steelhead. The terms and conditions will also provide protection to other aquatic species. Responses to comments 3-2 through 3-5 address the commenter's last concerns.

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	on specific Terms and Conditions below [comment 3-2 through 3-5] reflect that premise.	
3-4	*T&C 3: Dredge sites must be located in areas of large substrate not preferred for spawning steelhead and bull trout.* • Dredge sites should not be located in areas used for and suitable for spawning, not just those "preferred" by steelhead and bull trout. • Since the impacts of dredging can be expected to extend beyond the actual area of dredging (e.g., 300' sediment/turbidity zone), the "dredge site" should be defined to include both the area where suction dredging will occur and 300' downstream for the purpose of protecting habitat downstream. • Dredge sites should also be prohibited in areas used for spawning by westslope cutthroat trout or in substrates used/suitable for Pacific lamprey for spawning or rearing. *T&C 14. Operators must visually monitor the stream for 300 feet downstream of the dredging operation ... and cease immediately* or *decrease in intensity until no increase in turbidity is observed 300 feet downstream.* We do not believe a "visual" assessment is a suitable means to assess water quality impacts of dredging. It is also unlikely that visual observations are adequate to satisfy state water quality requirements. Provisions should be made to measure turbidity daily and to respond immediately if standards are not met at the point of discharge.	The terms and conditions are designed to protect or minimize impacts to stream channel geomorphology, aquatic habitat, and minimize the potential for a take of T&E species. T&C 3 (EIS, Section 2.1.2) prohibits dredging "... in areas of known bull trout (and steelhead, in the case of Lolo Creek) spawning or in areas identified as spawning habitat." This identification would be made by the Forest Service biologist who inspects the proposed site prior to the mining season. As noted in the EIS, any observed turbidity caused by discharges from suction dredges would be expected to dissipate by 300 feet downstream. Such instances would occur only when operators were working in fine material, which is neither common nor widespread in these creeks. The Forest Services does not expect there to be anything other than transient effects on downstream habitats. As with steelhead trout and bull trout, westslope cutthroat trout spawning sites and pacific lamprey spawning and rearing sites will be identified during the pre-mining field review and avoided. The Forest Service believes that visual observation is sufficient. Based on our past experience, turbidity levels that are less than 50 NTUs are very detectable visually. It should also be noted that the Biological Opinions prepared by the Fish and Wildlife Service and NOAA Fisheries recommended visual observations to detect turbidity. However, the Forest will be monitoring turbidity levels via instruments to determine the average increases in NTUs and if any operations are exceeding the State standard of 50 NTUs.
3-5	*T&C 22. Dredging operations must be shut down immediately if fish eggs are excavated, if sick, dead, or injured steelhead or bull trout are observed, or if destruction of redds is observed.'* • We agree with the requirement to shut down and report any of the above impacts to fish. Again, however, we recom-mend that the same protective conditions should apply for Chinook salmon, westslope cutthroat trout and Pacific lamprey. • Since operators may not recognize 'sick' fish, we recommend immediate shutdown and reporting if fish, appear "distressed" or show any unusual behavior. • Will operators be trained or tested to ensure that they can identify	Because of the inability to discern the fish species, the requirement to shut down basically applies to the disturbance of any redds or excavation of fish eggs. While this requirement applies to steelhead trout and bull trout, the likelihood of this action occurring is very remote as steelhead trout spawning, egg incubation and fry emergence is completed prior to the dredging season in Lolo Creek and bull trout spawning occurs after the closure of the dredging season. This situation would also apply to spring-spawning westslope cutthroat trout and Pacific lamprey within the project areas. Besides the protection measures for the two listed species, this requirement was primarily imposed to minimize impacts to spring chinook salmon that may be spawning in early August during the last two weeks of the dredging season. The provision to shut down if sick, dead, or injured fish other than steelhead trout and bull trout does not apply to non-listed species.

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	eggs and larvae in their excavated material, or to differentiate between various fish species, including eggs, larvae and juveniles of various species? • The permitting process should allow no opportunity for destruction of redds. We recommend a requirement for a qualified fish biologist to survey potential dredge mining sites, including the 300' downstream allowable turbidity zone, for redds prior to permitting and start-up of operations. Monitoring should continue throughout operations. to ensure no redds are compromised by dredging or sediment discharge.	Populations of spring chinook salmon in Lolo Creek and westslope cutthroat trout within Lolo Creek and Moose Creek drainages are relatively healthy, subject to harvest and not threatened at this time. Of course, the operators are required to avoid injury to all fish, especially small juvenile fish, as species identification is difficult at the fry stage. The Forest Service believes the operators are sufficiently familiar with various adult fish and do not require special training. As noted above, however, the operators do need to be able to distinguish eggs, and juvenile steelhead trout (rainbow features) and bull trout (char features) to meet the requirement. The Forest Service agrees: each proposed site will be inspected by a Forest Service biologist prior to operations to determine potential spawning areas within Lolo Creek. The Forest Service, with assistance from the Nez Perce Tribe (during their spring chinook spawning surveys), will assess the dredging locations, turbidity etc with any spring chinook salmon spawning activity within the Lolo project area.
3-6	*T&C 24. Dredging operations must be shut down immediately if the operator observes bull trout in either creek or steelhead in Lolo Creek.* • Will operators be trained, tested to ensure that they are able to identify bull trout, including juveniles, as well as other species the Terms and Conditions are designed to protect? • Operations should also be shut down if someone other than the operator reports a valid observation of bull trout in either creek or steelhead in Lolo Creek.	• The Forest Service believes that operators are sufficiently familiar with adult bull trout and other species to identify them as necessary. During the pre-mining field review and throughout the dredge season, the Forest Service will work with the operators educating them so they can identify eggs, juvenile steelhead and bulltrout. • Condition 24 as proposed in the draft EIS was reviewed during 2004 consultation by the Forest Service, NOAA Fisheries and FWS. The condition was not considered or deemed necessary by the three agencies and was not included in the Biological Assessment or Biological Opinions. Condition 24 has been removed as a term and condition in the final EIS.
3-7	... [W]e are also concerned that monitoring of conditions of operation and decisions to cease operations seem to be left primarily to the operator. Monitoring to meet many of the conditions (*e.g.*, occurrence of redds, identification of suitable spawning habitat, identification of juvenile salmonids) requires special training or qualifications that operators are not likely to possess. We believe that frequent, nearly continuous, oversight of operations by qualified Forest Service biologists may be necessary to ensure successful implementation of the Terms and Conditions.	As described in EIS (Section 2.1), the Forest Service will inspect each operation before the mining season, at least five times during the six-week mining season, and again after mining ceases. The Nez Perce Tribe will also assist the Forest Service with inspections on Lolo Creek. This level of oversight by Forest Service and Tribal employees should ensure the operators comply with the terms and conditions of approval.
4-1	Visual observation of excess turbidity at 300 feet downstream is too subjective. The levels should be quantified with instrumentation or quantitative analysis. The cumulative impact of multiple miners working on concurrent sections of the creeks also makes this self regulation	The Forest will be monitoring turbidity levels via instruments to determine the average increases in NTU's and if any operations are exceeding the State standard of 50 NTUs (EIS, Section 2.1, Monitoring Condition #3). Limiting the number of dredge operations to 18 and the requirement of

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	potentially unworkable.	minimum 100-foot spacing between dredge operations will greatly lessen the potential for multiple miners working on concurrent sections. The Forest Service believes that visual observation of turbidity is sufficient. Based on our past experience, turbidity levels that are less than 50 NTUs are very detectable visually. It should also be noted that the Biological Opinions prepared by the Fish and Wildlife Service (2006) and NOAA Fisheries (2006) recommended visual observations to detect turbidity.
4-2	The criterion of ceasing operations if two drops of mercury are discovered is too subjective. This criterion should be changed to any visible mercury.	The criterion will be changed to, "The operator will not entrain, mobilize, or disperse any mercury discovered during mining operations. Rather, the operator will ensure that all mercury observed is removed from the stream." (EIS, Section 2.1,Term and Condition #28)
4-3	The Forest Service must ensure that each of the terms and conditions contained in the biological opinions are strictly adhered too. This will require the Forest Service to adequately fund an aggressive monitoring and enforcement program to ensure that permittees are adhering to the terms and conditions. If the Forest Service discovers violations of the terms and conditions, the Forest Service should immediately revoke the suction dredge mining permit.	As noted in response to other comments above, the Forest Service will visit each prospective dredging site before the mining season, will inspect each active operation on approximately a weekly basis during the mining season, and will verify reclamation has been completed after the end of the mining season. This will ensure compliance with the terms and conditions. (EIS, Section 2.1, Monitoring Condition #3, #6 and #7) The Forest Service does not have authority to immediately revoke a suction dredge permit. If violations are discovered, then the Forest Service will follow non-compliance procedures outlined in regulations at 36 CFR 228A.
4-4	In addition to permit monitoring and enforcement, the Forest Service needs to aggressively conduct biological monitoring to ensure that the terms and conditions do not negatively impact fish, water quality, or fish habitat. The Tribe remains concerned about the Forest's ability to conduct such biological monitoring, given the recent trends to cut back such funding.	As noted in the EIS (Section 2.1) and in responses to other comments, the Forest Service will visit each site before the mining season to verify site conditions, will inspect each operation at least five times during the six-week mining season to verify compliance, and will visit each site after the mining season. (Section 2.1, Monitoring Condition #3, #6 and #7) As in the past 15 years, the Forest will continue to monitor fish populations within Lolo Creek at the 15 permanent monitoring stations. As detailed in the Biological Opinion for steelhead trout, the Forest will monitor substrate conditions. In addition, the Forest will be relying upon fish population data collected by the Nez Perce Tribe.
4-5	The Tribe hereby requests participation in all monitoring efforts. I understand that the Forest Service is proposing a pre-mining tour, as well as five (5) monitoring trips during operations. The Tribe also requests to receive all future monitoring reports related to this project.	The Nez Perce Tribe has participated in pre- and post-mining reviews in the past and will be notified when future reviews need scheduling. The Tribe's participation in site visits will help insure compliance with the monitoring requirements. Copies of the monitoring reports will be made available to the Tribe.
4-6	Due to the high biological risks associated with suction dredge mining,	Bonding is discretionary. However, Forest Service Manual direction (FSM

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	the Tribe urges the Forest Service, to require all permittees to post a bond before beginning operations. The bond should be significant, nothing less than $1000. The Tribe welcomes further discussion on bonding, and how the Forest Service might use the bonding fee to fund monitoring and enforcement.	6561.3) requires bonds to cover the actual costs of reclamation described in a plan of operation. An analysis of the reclamation costs will be prepared for each operating plan. If costs exceeds the $200 minimum threshold (FSM 2817.24), then a bond may be required. The bond amount has to reflect actual costs and is subject to challenge through the FS appeals process (36 CFR 251).
5-8	There also must be effective monitoring and enforcement of the rules and regulations governing mining at each mine site and assurance that each of the claimants has the proper permits and licenses before initiation of the mining operation. Frankly, we question whether and how the agency can enforce the provisions proposed under various alternatives such as if fish eggs are evacuated or mercury is discovered (see DEIS chapter 2).	As noted in the EIS and in responses to other comments, the Forest Service will visit each site before the mining season to verify site conditions, will inspect each operation at least five times during the six-week mining season to verify compliance, and will visit each site after the mining season to verify reclamation has been completed. Two of the terms and conditions require the operators to stop operating and notify the Forest Service if they disturb fish eggs (EIS, Section 2.1, condition 24) or observe mercury (EIS, Section 2.1, condition 28). If violations are discovered, then the Forest Service will follow non-compliance procedures outlined in regulations at 36 CFR 228A.
5-9	... the conditions do not guarantee no harm to fish or other aquatic organisms. They are based upon the assumption that the conditions will be followed. It expects dredge miners are experts in fisheries (items 3, 6, 15, and 24) and expects them to notice tiny fry or alevins and notice if mercury is displaced (items 22 and 29). All the above is difficult even where operators are trying to comply. Other conditions are subjective in nature.	The Forest Service believes the terms and conditions, which mirror the measures stipulated by USFWS and NOAA Fisheries in their respective Biological Opinions, are sufficient to protect fish and other aquatic organisms. The conditions do not require special expertise in fisheries and should be readily achievable by operators. The Forest Services has found that suction dredge operators are very capable of monitoring conditions and identifying fish fry and alevins, and of identifying mercury. In general, they already do this, and the conditions do not require any extraordinary alertness or observational skill.
5-10	Although the Forest Service cannot categorically deny a reasonable plan of operations, *it can reject an unreasonable plan and prohibit mining activity* [emphasis in original] until it has evaluated the plan and imposed mitigation measures." <u>Siskiyou Regional Education Project v. Rose,</u> f57 F. Supp. 2d 1074 (D. Or. 1999)(emphasis added by commenter).	The Forest Service agrees. The terms and conditions with which small-scale suction dredge operations will have to comply are reasonable and sufficient mitigation measures to protect Forest resources.
5-11	Under 36 CFR 228, the agency should require a financial assurance that ensure that reclamation would be completed in the event of abandonment of the site. This is especially critical due to the problematic economics of gold recovery. The DEIS fails to detail the amount, scope, and form of the financial assurance. None of the 30	The Forest Service does not believe bonding is necessary. The small-scale nature of the operations evaluated in the EIS, and the fact that there will be at least five inspections during the six-week mining season, limits the amount of reclamation that could go uncompleted in the event of abandonment.

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	conditions address bonding.	Bonding is discretionary. However, Forest Service Manual direction (FSM 6561.3) require bonds to cover the actual costs of reclamation described in a plan of operation. An analysis of the reclamation costs will be prepared for each operating plan. If costs exceed the $200 minimum threshold (FSM 2817.24), then a bond may be required. The bond amount has to reflect actual costs and is subject to challenge through the FS appeals process (36 CFR 251).
6-3	We will need to limit the number of people that can mine at any one time. Establish a mining season and shut down mining when stream levels get very low.	The Forest Service agrees that there should be a limit to the number of mining operations, and that there should be a defined mining season. The EIS evaluates the potential impacts of approving up to 18 proposed plans of operations on Lolo Creek and up to 38 on Moose Creek, and also establishes a six-week mining season from July 1 to August 15. The Biological Opinions and the EIS concluded that this number of small-scale dredges operating during this time would have only minor impacts to the streams. The time of lowest stream flow generally occur in late August through October, after the mining season ends.
7-2, 11-1	In several places the DEIS states that the stream will be reclamated by the end of the mining season. Small Scale Miners, reclaim their dredge holes as they move forward until they reach the last hole or when we have to move to another area. Then we turn the dredge around and dredge the hole full or back as close to grade as possible. I would like to urge that we be given at least one day after the season is over, to reclaim where we have worked. (Reference to page: ES-6, ES-7, 2-5,2-15, 3.1.2 item 21)	In order to comply with the terms and conditions listed in the EIS, all instream activities, including reclamation activities in Moose Creek and Lolo Creek have to be completed on or before August 15.
7-3	I would like to suggest that you let the miners remove the logs that were put in to make spawning beds. All they are now is silt traps. This would reclaim more spawning beds. The Fish and Game have been doing the same thing and this way we can extract the gold.	The impact of removing log weirs is beyond the scope of this analysis, and would have to be addressed in a separate environmental analysis. Until such time, all large stable woody debris that extends from the bank into the channel may not be undermined, excavated, or removed (EIS, Section 2.1, Conditions 13 and 14).
11-2	The DEIS states in several places that the stream will be reclamated by the end of the mining season. In most cases we fill in our holes behind us as we dredge, however I urge that we be given at least one day after the season is over to reclaim where we have worked. (Reference to page: ES-6, ES-7, 2-5, 2-15, 3.1.2 item 21)	In order to comply with the terms and conditions, all instream activities in Moose Creek and Lolo Creek have to be completed on or before August 15.
11-3, 7-4	Under the Terms and Conditions in section 2 and under 3.0 Environmental Consequences, item 8 should read "All human waste must be kept more than 200 feet away from any live water *or as approved by the Forest Service*."	All human waste must be kept more than 200 feet away from any live water, or contained within a sanitary portable toilet.

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11-4	Item 18 should change to: "Operators may not remove, relocate, or disturb stable in-stream woody debris or ***remove*** boulders greater than 12 inches in diameter.	The wording of former Condition 18 (currently condition 14) remains unchanged. NOAA Fisheries and FWS have reviewed the wording of the mitigation measures during 2004 consultation. No changes were made to Condition 18. Changes to wording of a mitigation measure would require concurrence from both agencies before changes are made.
11-5	Under the monitoring and reporting by the Forest Service as outlined in the Terms and Conditions in section 2 and under 3.0 Environmental Consequences, 3.2.2: Item 1 specifies that the FS monitor operations five times during the mining season. Even though we would welcome a visit by our friendly FS representative, this hardly seems practical for those miners that only operate for a week or as little as a week end. I would propose that the FS visit at least once for every week of operation, with a maximum of 5 visits. We only have a six-week season.	The wording of the monitoring of active operations will remain unchanged. The monitoring requirement has gone through NOAA Fisheries and FWS review and no changes were made during 2006 consultation. Changes to wording of a monitoring measure would require concurrence from both agencies before implementation. The monitoring requirement was specifically geared to ensure the Forest monitored operations throughout the dredging season. For operations that extend over the full six-week period, we expect to visit each operation a minimum of five times. For other operations that extend for one weekend, the monitoring requirement would mostly likely be met with one visit.
11-6, 7-5	2-1, Mitigation Measures lists the intakes having a 2/32 screen. It should read 3/32	This has been corrected.
7-6, 11	In the Environmental Consequences "Item 9 under the Terms and Conditions; should start with "NO".	No correction is needed. Former Condition 9 (currently EIS, Section 2.1, condition 17) has been edited and starts with "No".
9-1	I would say ok on this project if no fish were in the area..., but if any fish are there, then no mining should be allowed.	Condition 24 was reviewed during consultation with NOAA Fisheries and FWS. The condition was not considered or deemed necessary by either agency and was not included in their respective Biological Opinions. Condition 24 has been removed as a term and condition in the final EIS.
Existing Conditions (Chapter 3)		
1-10	*Page 3-7* A reference is made to USFS 2001e, which was not found in the reference list.	This has been corrected in the final EIS.
1-11	*Page 3-9* Typographical error based on September bedload rates, change as follows: "... bedload ranges between 5 percent and 61 percent ..."	This has been corrected in the final EIS.
5-12	.... the DEIS fails to address issues we raised in our scoping letter. In particular, monitoring current conditions would be important to see what the impacts of suction dredging are on the Clearwater National Forest. For example, camping in one place beyond 14 days and the impacts of repeatedly loading the dredge from the trailer or pick-up in and out of the streams.	The Forest Service anticipates that camping would continue at approximately the same level even without suction dredging, so there would be no incremental impact due to camping by suction dredge operators. A discussion of impacts on riparian vegetation, stream banks and upland areas associated with the No Action and the Action Alternatives is provided in Section 4.9 of the EIS. Additionally, suction dredge operators generally load their dredge into the stream the first day of operation and then do not remove it until the last day, so there is not repeated loading

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		and unloading.
Water Quality (Chapter 4)		
1-12	EPA has concerns related to water quality and the lack of information regarding affected environment and cumulative effects. EPA's water quality concerns relate to the potential number of simultaneous mining operations, turbidity, bedload impacts, and lack of site-specific information on effects of dredging. EPA believes that too many dredges operating at once could have potentially significant impacts on individual stream reaches. We recommend that the EIS address this concern and include contingency measures for unforeseen circumstances.	See response to comments 1-23, 1-26, 1-28, 1-30, 1-32, 1-33, 3-4, 4-1 and 6-3. The terms and conditions are designed to minimize impacts to channel geomorphology and minimize turbidity in the water column downstream. The EIS will be modified to highlight that there is a greater potential for impacts to turbidity from multiple operators within close proximity and the conditions for them to cease operations. The terms and conditions specify that dredgers must operate in areas of large substrate (EIS, Section 2.1, T&C 6), they cannot operate in gravel bar areas at the tails of pools (EIS, Section 2.1, T&C 19), and they may not operate in such a way that sediment from dredge discharge blankets gravel bars (EIS, Section 2.1, T&C 20). Potential impacts to substrates and channel geomorphology are discussed in Section 4.2.2 of the EIS. The EIS concludes that small scale suction dedging would not result in long-term alternation of stream channel morphology or stream equilibrium when the conditions are properly followed. Dredging through the substrate and depositing these materials back into the channel does not result in an increase of bedload, which is the rate of movement and transport of substrate continuously downstream. The terms and conditions mitigate any significant or long-term effects to the bedload moving within a stream. Morphology of sites will be monitored by the methods described in response to comment 1-28.
1-13	... EPA recommends that components of the alternatives be considered such as limiting the number of dredges operating at a time, limiting the hours of operation per day, and/or limiting the amount of material each dredge could process.	See response to comment 1-30.
1-14	We believe that the EIS should discuss the proposed 303(d) listing of Lolo Creek and how the TMDL will drive future management decisions once developed.	A discussion of the proposed Section 303(d) listing has been added to the final EIS. It is premature to discuss how the future TMDL may drive management decisions.
1-15	We recommend that the EIS have additional discussion on potential bedload impacts, include additional information on cumulative impacts on water quality and aquatic habitat related to historic, currently proposed, and reasonably foreseeable future mining and include these	See response to comment 1-2 above. Cumulative impacts are evaluated in Section 4.16 and are based on past watershed practices and all reasonably foreseeable future mining activities.

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	discussions in the EIS.	
1-16	It is unclear how the instantaneous IDEQ turbidity standard (background turbidity shall not be increased by more than 50 NTU) relates to the proposed requirement that visible plumes shall not extend more than 300 feet downstream. The EIS should explain how many NTUs are equivalent to a visible plume. This information is necessary in demonstrating that the operations would meet water quality standards.	There is no direct relationship between a visible plume, which is qualitative, and a quantitative measurement of turbidity. However, it is our experience that turbidity levels that are less than 50 NTUs are very detectable visually. It should also be noted that the Biological Opinions prepared by the Fish and Wildlife Service and NOAA Fisheries recommended visual observations to detect turbidity. Suction dredging in the Moose Creek and Lolo Creek project areas often results in no visible plume of fine sediments downstream. However, the 300-foot downstream condition is imposed so the operator can reasonably apply a Best Management Practice to be in compliance with the standard of no more than a 50 NTU instantaneous increase below an established mixing zone. As stated above in the response to comment 3-4, the Forest will be monitoring turbidity levels via instruments to determine the average increases in NTUs and if any operations are exceeding the State standard of 50 NTUs. Also, it is important to note that the Forest Service will not approve plans of operations unless the operator has sought coverage by an NPDES permit. It is anticipated that EPA would address turbidity in any NPDES permits.
1-17	*Page 2-12* EPA recommends that the EIS discuss whether or not the loss of relative stream bed stability is possible in areas which have been mined.	Potential impacts to stream channel geomorphology and stability are discussed in Section 4.2 of the EIS.
1-18	*Page 3-7* The EIS states that Lolo Creek does not meet the Forest Plan sediment standard. The EIS should further discuss this issue by stating the source of sediment and how this standard relates to Idaho State standards.	Lolo Creek does not currently meet the Forest Service plan standard for sediment. This is a goal relating sediment yield from the watershed to land management practices and is used for land planning and management. There is no relationship between this standard and Idaho water quality standards, which are related to turbidity and impacts to beneficial uses. The amount of sediment in a stream and the degree of embeddedness is a result of past watershed practices and conditions which have improved, reducing sediment delivery to the creeks (see EIS, Sections 3.2.3 and 3.3.3). These have improved (that is, have been reduced) as a result of changes in practices in the watershed. Embeddedness is naturally reduced as sediments are naturally transported by the creeks out of the watershed. It is not expected that suction dredging significantly impacts sediment delivery to stream systems or sediment transport from the watershed. The sources of sediment in Lolo Creek are from past and present watershed management activities such as logging, roads, grazing and fire. The EIS will be modified to clarify relative erosion and sediment yield in the watershed

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		in relation to past and present land use activities.
1-19	*Page 3-11* Discussion of temperature criteria should also include the Idaho salmonid spawning criteria, and the federal bull trout criteria.	Since the bull trout and steelhead trout spawning seasons do not overlap the mining season, the EIS does not discuss temperature. The Forest Service will add the criteria to the EIS, however.
1-20	*Page 3-45* Table 3-18. The percent substrate composition of particles in the sand size and smaller differ substantially between this table and 3-7 and 3-6 for Moose Creek and Independence Creek, respectively. Table 3-7 and 3-6 show much higher levels of fine material, and are based on a more recent (2003) reference. The EIS should indicate which is more representative of current conditions.	The data presented in Figures 3-6 and 3-7 are from different studies that occurred on different reaches within the Moose Creek watershed. The data available for Figures 3-6 and 3-7 show size fractions <2.0 mm (small gravel and less), while data in Table 2-8 shows smaller size classes. The EIS will be modified to further expand discussions of existing particle size distribution.
1-21	*Page 2-7* The text should clarify that the Idaho ambient turbidity standard is ≤25 NTU above background for 10 consecutive days, and not to exceed 50 NTU above background (IDAPA 58.01.02.250.02.e).	The EIS will be modified according to the comment.
1-22	*Page 2-8* "These data show that sediment production in Lolo Creek is meeting State water quality standards and beneficial uses for steelhead trout and cutthroat trout as listed in the Forest Plan for the Lolo Creek watershed (USFS 1987)." We agree that the turbidity data indicate compliance with the turbidity criteria cited above, however, Idaho also has a narrative sediment standard which indicates that sediment shall not be present in quantities which will impair beneficial uses (IDAPA 58.01.02.200.08). This provision can account for impacts from other forms of sediment not captured by the turbidity criteria, such as excessive bedload. Since Idaho is planning to list Lolo Creek for sediment in the project area, this section should be revised to indicate that while data show compliance with turbidity criteria, Idaho has determined that sediment is impairing beneficial uses. Idaho has not completed a similar assessment of the Moose Creek drainages for 303(d) purposes.	Section 4.1.2 and 4.3 of the EIS indicates that there would be no discharge of new sediment to the creeks. Former Condition 10 (currently Condition 8) stipulates that operators not undercut, destabilize or ~~otherwise~~ disturb streambanks, which would be sources of new sediment (see Section 4.3.2 of the EIS). As discussed in Section 4.1.2, "...dredging would not introduce sediment to or increase sediment...." See response to comment 1-2 concerning bedload and response to comment 1-6 concerning NPDES permit requirements and compliance with a TMDL when completed.
1-23	*Page 4-2* Section 4.1.2 indicates that sediment would not increase in the study areas, but substrate sediment would be dredged and then settle out within a short distance. We believe other aspects of this sediment movement need to be addressed to make this discussion complete. The EIS does not provide information to substantiate what a "short distance" is, nor whether all size fractions of sediment will settle out in a short distance. Coarse sands and gravels likely would settle out quickly, but sand size material may contribute to increased bedload movement, and finer fractions (silts and clays) could be transported much greater distances downstream. We recommend further addressing this concern and avoiding dredging up silts and clays and if these are encountered that the dredging process should cease to operate and	EIS sections 3.2.2, 3.3.3, 3.2.4, 3.3.2, 3,3,3, and 3.3.4 provide data available concerning relative distributions of particle sizes within the substrate. And streamflow velocities in relation to total sediment load. These data are provided to show relative amounts of small size fractions and their potential for entrainment and transport. Potential impacts related to the entrainment and transport of small size fractions in relation to stream velocities is provided in section 4.3.2. The Forest Service feels that the condition which stipulates that operations must cease when visible plumes extend past 300 feet addresses impacts related to dredging in areas with smaller transportable size fractions.

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	move to another location.	
1-24	*Page 4-2* We are concerned that while the sediment which is moved is part of the existing stream bed, it is being introduced into the water column at a time of the year (summer) when elevated water column and bedload sediment loading typically does not occur. Given the low flows at this time, sediment in the water column will not be diluted by higher flows, and bedload sediment will be less likely to be flushed from the system. Furthermore, dredging into the substrate several feet and/or to bedrock may be below the typical scour depth from high spring flows. Sediment dredged up from such depths would only be exposed by typical stream flow infrequently, rather than annually during the dredge season. EPA recommends providing additional discussion regarding this concern.	Temporary increases in total suspended load that could potentially result from dredging in some locations would not be significant in relation to normal increases in total suspended load that occur during convective storm events which occur throughout the summer. Dredging through the substrate and depositing these materials back into the channel results in an increase of bedload, which is the rate of movement and transport of substrate continuously downstream or that it significantly increases the amount of sediment in a stream system.
1-25	*Page 4-3* Water Quality Effects, Alternative 2. As stated in the previous comment, sediment introduced by dredging is atypical in that it occurs at a time of year when normally it would not, and a greater depth of sediment may be liberated than would normally occur during annual high flows. The ambient turbidity criteria cited in this section is correct, but Idaho water quality standards also include a treatment technique for point sources, which specifies that point source discharges must not increase turbidity by more than 5 NTU above background outside the mixing zone (IDAPA 58.01.02.401.03.b). This treatment requirement was included as part of the wasteload allocation for suction dredging in the SF Clearwater TMDL (IDEQ, Nez Perce Tribe, USEPA, 2003), and should be cited as a relevant standard in the EIS.	See response to comment 1-6. The Forest Service will not approve plans of operations unless the operator has sought coverage under an NPDES permit. EPA would ensure that NPDES permits are brought into compliance with TMDL requirements when the TMDL is developed, with specific discharge requirements regarding turbidity limits and mixing zones as needed.
1-26	*Page 4-3* The EIS states, "These extremely and localized and temporary increases would not be significant compared to the background total sediment loads of 1,541 and 500 pounds per day in July and August ..." We estimated what the combined fine sediment ($\leq$ 2 mm) loading would be in each stream assuming each facility was operating, each was discharging 5 yd^3/day, and average stream flows for July - Aug. In Table 1 below, we compared this to average suspended sediment loading measured in these streams from Tables 3-4, 3-13, 3-14, and 3-15, averaging the July - August readings.	The analysis suggested in this comment implies a discharge or load from a new source to the creek. As noted in the EIS, and in responses to other comments above, small-scale suction dredging does not introduce new sediment to the creeks. The comment assumes that all excavated fines less than 2 mm in diameter would stay suspended in the water column and attribute to decreases in turbidity in the water column. The Forest Service does not agree that an assumption of a size class of 2 mm and smaller is a reasonable or realistic analysis to assess impacts to water quality, aquatic habitat, or fishes. The following analysis is offered as a response to this comment. USDA commonly accepted size classes and definitions are used for perspective. By definition particle sizes greater than 2 mm is "gravel"; 1 mm to 2 mm is defined as "very course sand"; 0.25 mm to 1.0 mm are defined as "medium and course sand"; 0.1 mm to 0.25 mm is defined as "fine sand"; 0.05 mm to 0.1 mm is defined as "very fine sand"; and silts are

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		defined as being less than 0.05 mm. Given the disturbance of bed materials by dredging and relatively low flow velocities in July and August, a conservative assumption is that size classes of 0.25 (fine sand) and lower (very fine sand and silts) may remain suspended long enough downstream to potentially impact turbidity in the water column.

Table 1

Stream	# Operations	Estimated Loading from Dredges	Historical Measurements	
		Fines < 2 mm (lb/day)	Suspended Sediment (lb/day)	Total Sediment (lb/day)
Lolo Creek	18	30,579	1,020	1,369
Independence Creek	6	35,284	80	352
Moose Creek	6	20,125	3,193	3.320
Deadwood Creek	6	21,954	88	534

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1-26 (cont'd)	As can be seen, the estimated potential volume mobilized from these facilities is up to 30,000 pounds per day or more, far greater than that which has been measured historically, and raises serious concerns about cumulative impacts of both suspended sediment and bedload movement. While these values may not be strictly comparable, they do provide a sense of the relative magnitude of potential sediment movement from the dredges compared to historical measurements of sediment movement in the stream. This is of particular concern given the large number of facilities which could operate, and during the very low flows which occur in these streams in July-August. While the likelihood that all these facilities will operate simultaneously may not be high, it is not a worst case scenario. Under current IDWR rules, each facility may discharge up to 2 yd^3/hour. Assuming each facility is operated 8 hour/day, they would discharge 16 yd3 of material vs. 5 yd3/day used in the estimates above. Further, the EIS indicates that 38 facilities could operate in the Moose Creek drainage. We estimated loading for only 26 facilities shown in Figure 2-2. The additional 12 facilities not shown in the figure would increase the estimated sediment loading shown in the table above. The EIS should consider these possibilities, and offer alternatives or strategies to address the potential consequences.	It is a very reasonable assumption that gravel and course sands would settle out almost immediately. The data used to depict particle size distributions in Lolo Creek in Figure 3-1 show that size classes less than 0.25 mm (sand) is 0.25% of the substrate material. Assuming suction dredge operations in Lolo Creek disturb 5 yd^3 /day (a conservatively high value), 0.25% of this material could potentially impact turbidity until settling out; and the particle density is 2.6 g/cm^3 (a commonly accepted value for most minerals), the result is 55 lbs per day per operator. Assuming 18 simultaneous operations results in 990 lbs per day, although is must be noted that the 990 pounds is not discharged at a single location but at locations spread out along 10 to 11 miles of stream. A similar analysis for Moose Creek using data from Table 3-19 results in approximately 109 lbs per day per operator. As discussed in Section 4.3.2, these levels would not be significantly higher than the background total suspended loads for Lolo and Moose Creek. See response to comment 1-14 in regards to bedload.
1-27	*Page 4-7* The EIS suggests that measurable indirect effects from turbidity and sediment would occur within 100 meters, based on work by Royer, 1999. While we don't dispute the findings of Royer's work on the	The Forest Service considers the evaluations by Royer a worst-case scenario for the reasons stated in the comment because effects from 8-inch and 10-inch commercial dredges were evaluated. The Forest Service therefore

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	Fortymile River in Alaska, the rivers in which he evaluated sediment impacts were 70 - 80 meters wide. It would be difficult to extrapolate results from this work to the Lolo and Moose Creek given the significant difference in stream flow and stream power. We recommend that data from other studies locally at a smaller scale be used, or that site specific information be developed to evaluate downstream sediment impacts from dredging	feels that this analysis is a reasonable and appropriate disclosure of potential impacts.
1-28	*Page 3-2* "Lolo Creek has not been identified as having any water quality concerns within the project area." In 2003, Idaho proposed to include Lolo Creek in the Idaho 303(d) list from the source to Yakus Creek for: bacteria, nutrients, oil/grease, dissolved oxygen, sediment, and temperature[1]. The segment from Yakus Creek to the mouth was proposed to be listed for sediment. These listings will remain in the final 2002 303(d) list which is expected to be submitted to EPA in the near future (personal communication, IDEQ, 5/14/04). IDEQ plans to develop a TMDL for Lolo Creek in 2005. The fact that segments of Lolo Creek in the project area will be listed for sediment and other pollutants should be identified in the EIS. USFS decisions regarding these dredges may need to be revised in the future depending upon the outcome of the TMDL.	See response to comment 1-6. The Forest Service has added a discussion of the listing to the EIS. As noted in the EIS and above, the Forest Service will not approve plans of operations unless they have sought coverage under an NPDES permit, under which EPA will ensure that discharges are in compliance with TMDL requirements (after the TMDL is developed.)
1-29	*Page 4-9* The EIS mentions that dredging could produce synergistic effects in streams with elevated temperature. As mentioned previously, Idaho is planning to add Lolo Creek to the 303(d) list for temperature in the reach in question, so it would be worth further evaluating these impacts to establish whether operating conditions described in Chapter 1 are adequately protective.	See response to comment 1-18 above.
1-30	EPA recommends collecting data upstream and downstream from some active dredges during the low-flow season to quantitatively evaluate the amount of turbidity that results from dredging (both individually and cumulatively). Although the DEIS predicts that the operations have no significant impact, the conclusion is based on a line of evidence rather than any measured information. Site-specific data would be very useful in the near future when TMDLs are done and when NPDES permits are developed.	As stated above in response to comment 3-4, the Forest will be monitoring turbidity levels via instruments to determine the average increases in NTUs and if any operations are exceeding the State standard of 50 NTUs.
1-31	EPA recommends that past monitoring of suction dredge operations in these or similar watersheds in the Clearwater basin be brought into the	The EIS uses the available literature on small-scale suction dredging (most of the literature used evaluates dredges up to 8 inches or more rather than

[1]IDEQ, Nez Perce Tribe, USEPA, 2004. South Fork Clearwater Subbasin Assessment and Total Maximum Daily Loads. Idaho Department of Environmental Quality, Nez Perce Tribe, U.S. Environmental Protection Agency. March 2004.

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	EIS to better clarify their potential impacts.	the smaller sizes of interest here, and this would make the evaluation conservative.)
1-32	Although the conditions of the permit appear good, we are concerned that there has not been a more thorough evaluation of the cumulative impacts of these operations on the sediment loading, particularly given the number of facilities which could potentially operate at one time, and given the very low flows which could occur during the July-August operating season. While we recognize that typically not all applicants operate each year, the analysis should evaluate this scenario, since by definition these permits could allow it to occur, and increasing gold prices may make it more likely.	The EIS evaluates the potential impacts of the maximum number of operations, which makes the evaluation very conservative since this many dredges have never been operated simultaneously. Also, see the response to comment 5-1 concerning the maximum number of operations that have been considered. For the purposes of this EIS, impacts from operators up to the maximum number stated are considered direct impacts. Cumulative impacts are evaluated in the EIS, Section 4.16, and are based on past watershed practices and all reasonably foreseeable future mining activities.
1-33	EPA recommends including a table that clearly lists each stream and whether or not they are meeting State water quality standards and Forest Plan standards for each criteria.	See response to comment 1-18. The Forest Service has added a discussion of the proposed listing to the final EIS. As noted in the EIS and above, the Forest Service will not approve plans of operations unless they have sought coverage under an NPDES permit, under which EPA will ensure that discharges are in compliance with TMDL requirements (after the TMDL is developed.) Idaho DEQ has proposed that sections of Lolo Creek within the project area be listed on the Section list discharges from the dredges will have to comply with the TMDL that is eventually developed; NPDES permits that authorize the discharges will require such compliance. The Forest Service acknowledges in the EIS that Lolo Creek does not currently meet the Forest Service plan standard for sediment. This "standard" is a goal relating sediment yield from the watershed to land management practices, and is used for land planning and management. There is no relationship between this standard and Idaho water quality standards, which are related to turbidity and impacts to beneficial uses. Regardless, the EIS concludes that small-scale suction dredging will have no effect on sediment yield.
4-7	Mining activity disturbs the creek bed, suspending sediment and causing large amounts of benthic organisms to artificially drift downstream.	The EIS evaluates the extent to which small-scale suction dredges disturb and suspend sediment and concludes that the effect is relatively minor and very localized. In addition, the EIS notes that benthic organisms may be displaced downstream, leading to a temporary increase in food available to downstream fish and a short-term (seasonal) reduction in food in the dredged area.
4-8	Fine grained sediment should be discharged on the bank in settling ponds.	From a watershed or subwatershed perspective, the Forest Service does not believe that requiring this practice, or even allowing it, would significantly reduce the amount of fine sediments occurring in stream substrates, significantly reduce embeddedness of the substrate, or provide significant

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		positive impacts to aquatic habitat. It would include the construction of settling ponds or direct discharge on the bank, each of which would require disturbance of the riparian zone.
5-13	The Forest Service is prohibited by the CWA (section 313) from permitting any activity that may violate water quality standards. Since the proposed project will discharge pollutants into the river and due to the fact these streams don't meet all fishery and water quality standards, the activity should not proceed.	From its source to Yakus Creek. the State identified Lolo Creek, which includes those reaches within the Project Area, as having water quality concerns from bacteria, nutrients, sediment, and temperature on their EPA approved 2002 303(d) list (IDEQ 2005) (see EIS, 3.2.1). Terms and conditions listed in EIS, Section 2.2, minimizes or eliminates discharges of wastes, chemicals, or new sediment to creeks (EIS, Sections 4.1.2 and 4.3.2). See response to comment 5-14.
5-14	While the impacts of dredging, including fine sediments released by dredging, are not well known, it is known that dredging increases sediment. Many of these streams do not meet standards that reflect sediment such as cobble embeddedness. The bears this out. However, it should be noted the DEIS is not clear on whether the Moose Creek area meets cobble embeddedness parameters. The DEIS notes that Lolo Creek doesn't, but there is no similar analysis or charts for Moose Creek.	Section 4.1.2 and 4.3 of the EIS indicates that there would be no discharge of new sediment to the creeks. Former Condition 10 (currently 8) stipulates that operators not undercut, destabilize or otherwise disturb streambanks, which would be sources of new sediment (see Section 4.3.2 of the EIS). As discussed in Section 4.1.2, "[d]redging would not introduce sediment to or increase sediment ...but rather would relocate it by removing it from the substrate, passing it through the suction dredge, and replacing it into the creek, where it would settle out within a short distance." Lolo Creek does not currently meet the Forest Service plan standard for sediment. This is a goal relating sediment yield from the watershed to land management practices. The amount of sediment in a stream and the degree of embeddedness is a result of past watershed practices and condition. These have improved as a result of changes in management practices, and this has reduced sediment delivery to the creeks (see Sections 3.2.3 and 3.3.3 of the EIS). Embeddedness is naturally being reduced as sediments are naturally transported by the creeks out of the watershed. It is not expected that suction dredging significantly impacts sediment delivery to stream systems or sediment transport from the watershed. The 2003 re-survey of selected streams reaches in the lower Moose Creek, Independence Creek and Deadwood Creek drainages that are sensitive to sediment impacts showed seven streams reaches meeting the substrate conditions (cobble embeddedness) for the "High Fishable" Forest Plan standard. The lower Independence Creek reach was the only site that did not meet the substrate conditions for the "High Fishable" Forest Plan standard. This survey information was summarized in the 2003 Forest Monitoring Report and will be included in the EIS.
5-15	WATBAL is used to analyze impacts to the watersheds. WATBAL described watersheds devastated by the landslides in 1995 and 1996 as recovered. Until recently, the WATBAL model was never peer-reviewed	Very few landslides occurred in the Moose Creek or Lolo Creek watersheds during the 1995 and 1996 floods. Any potential sedimentation impacts from minor landslides would have been minimal and insignificant in the areas

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	in a scientific journal. However, a recent peer-reviewed study of WATBAL by Hickey (1997) has documented that the WATBAL model consistently underestimates the amount of sediment actually reaching streams.	where suction dredging would be permitted. WATBAL has been used by the Clearwater National Forest to provide relative differences in stream runoff and sediment yield that would occur from large watersheds based on land management conditions and practices occurring. WATBAL was not designed (or used) to precisely quantify sediment yields that would occur from specific projects, but rather is intended to be a comparative tool to assist in decision making. WATBAL studies were appropriately cited and discussed in Sections 3.2.3 and 3.3.3 to discuss existing watershed conditions. Comments regarding Mr. Hickey's review were refuted by Mr. Rick Patten in his declaration for THE LANDS COUNCIL et al. vs. ROBERT VAUGHT, et al. These comments have been included as Attachment 1 to these responses.
5-16	... WATBAL seems designed for projects other than suction dredging. Such an activity is unique in that it disturbs the actual stream bed itself. While technically suction dredging may not add anything that is not already in the stream itself, the impacts of taking material from the stream bed and redistributing it in the stream must be considered. WATBAL is not formulated to do that. As such, it is an inappropriate model.	See response to comment 5-15 above. WATBAL was not used to evaluate impacts from small-scale suction dredging. Rather, WATBAL studies were cited and discussed to assist in describing existing watershed conditions.
5-17	One last issue regarding water quality is very important. The Clearwater National Forest Plan Settlement agreement does not permit activities that would increase measurable sediment in areas where forest plan water quality standards are not being met. This specific issue is not addressed directly in the DEIS in this context (see chapter 5).	The Settlement Agreement applies to new timber harvest and road construction activities only. Additionally, see response to comment 5-14 above, which emphasizes that suction dredging would not introduce or increase sediment in the creeks.
Fisheries (section 4.4) and Threatened and Endangered Fish (section 4.7)		
1-34	*ES-9* The EIS should provide more detailed information related to westslope cutthroat trout similar to the other Threatened and Endangered species.	More information regarding westslope cutthroat trout will be added to the EIS. The Forest Service notes that the intent of the EIS is to focus on T&E species which are far more susceptible and representative of potential impacts than relatively strong populations of westslope cutthroat trout or other fish.
1-35	*Page 4-8* We agree that the July 1 - Aug 15 time window avoids most of the major salmonid spawning windows, but we are concerned that sediment mobilized during this time may effect spring chinook spawning in Lolo Creek which would occur immediately after the dredging season ends.	The dredging activity will be restricted outside potential spawning areas, which will minimize impacts to spawning gravels. Another mitigation measure (current condition 22) to avoid adverse impacts to essential fish habitat for spring chinook salmon (similar to protection measure #27 in USFWS 2004 BO for Moose Creek) notes that the tailings must be re-distributed to avoid creating unstable (unnatural) spawning gravels.
2-2	Steelhead Trout: (EIS, ES-8) The DEIS underrates the wild/natural steelhead trout production potential in Lolo Creek: Steelhead trout	The Forest Service will meet with all miners in June prior to the dredging

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	were present in 207 of the 214 mainstem locations sampled in Lolo Creek, indicating widespread usage of the creek (EIS, 3-14, Table 3-9). Additionally, during Pacific lamprey sampling in the Lolo Creek drainage in 2004, Idaho Department of Fish and Game identified several hundred (total) age-0 and greater than fifty (total) age-1+ steelhead dispersed in multiple mainstem reaches. Steelhead trout spawning is known to occur in the Lolo Creek Snake Bite Place Claim reach -- one completed steelhead trout redd was observed in this reach in 2004. This observation reinforces the need for to survey for redds and steelhead presence prior to initiation of suction dredging in the reach. The greatest potential impacts of suction dredging in the Lolo Creek drainage are disturbance of rearing juveniles and displacement of spawning gravels. Preventing dredging in suitable spawning gravels will avoid the latter.	season and mark proposed dredge sites for biologists to inspect. After marking, the Forest Service will then schedule specific days where sites can be inspected by personnel from interested State, Tribe, or other Federal Agencies. As described in Chapter 2, a Forest Service biologist will inspect each proposed operation before mining begins to identify and advise operators on spawning areas, redds, and other key areas that need to be avoided.
2-3	Bull Trout: (EIS, ES-8) We anticipate that the primary impacts of suction dredge operations in the Moose Creek drainage would be disturbance of rearing bull trout and alterations of spawning and rearing habitat structure. A potential thirty-eight suction dredge operations annually in the drainage will undoubtedly displace rearing bull trout, as well as potential prey species. It is impossible for the USFS suction dredging "Terms and Conditions" (EIS, 2-2 to 2-7) to effectively limit this impact; therefore, this impact deserves greater review in the DEIS. Although the "Terms and Conditions" should protect spawning habitat and may adequately protect the morphological structure of the Moose Creek bull trout rearing habitat, the deconsolidation of substrates (estimated to exceed 380 m^3) in the basin annually from suction dredge operations) could exacerbate current channel instability linked to previous mining activities. This potential impact ... is not fully reviewed in the DEIS.	The Biological Opinions and the draft EIS stated that salmonids may be temporally displaced by activities during the hours of suction dredge operation, but that this temporary displacement would not significantly affect rearing salmonids. The terms and conditions include measures designed to minimize disturbance to rearing habitat, such as not operating in gravel bars at the tails of pools (condition 19 [former condition 13]) and not altering the thalweg (condition 16 [former condition 6]). Potential impacts to substrates and channel geomorphology are discussed in Section 4.2.2 of the EIS. The EIS concludes that small scale suction dedging would not result in long-term alternation of stream channel morphology or stream equilibrium when the conditions are properly followed.
2-4	Westslope Cutthroat: (EIS, ES-9) The impacts of suction dredging to westslope cutthroat *O. clarki lewisi* in Lolo Creek and Moose Creek are expected to mirror those of other species; however, the distribution and abundance of the cutthroat is greater in both drainages than other salmonids and Pacific lamprey, potentially providing a buffer for human activities. It is essential, however, that suction dredge activities are closely held to the USFS "Terms and Conditions" to ensure cutthroat trout populations, including current distributions, remain intact in the two drainages.	By requiring each prospective operator's affirmative commitment to comply with the terms and conditions, and by its own frequent inspections, the Forest Service intends to ensure that operators remain in compliance with the terms and conditions.
2-5	Pacific Lamprey: Impacts of suction dredging to Pacific Lamprey were not addressed in the DEIS. Pacific lamprey are considered in precipitous decline in Idaho and the species throughout the Pacific Northwest range was petitioned for federal Endangered Species Act listed protection in	Additional information regarding Pacific lamprey will be included in the EIS. In addition, the Idaho Department of Fish and Game will assist in the identification of potential lamprey spawning and rearing sites during the pre-project field review. Similar to suction dredging on the South Fork

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	January 2003. Suction dredging in Lolo Creek will likely impact Pacific lamprey to a greater degree than other species. Pacific lampreys occupy the substrates and organic debris depositional locations in stream channels for an estimated 4-7 year rearing period prior to transformation and migration to the estuary and ocean. Suction dredge activities potentially will result in mechanical damage to age-0 Pacific lamprey through adduction into the intake. • The USFS suction dredge intake requirement of 3/32 is larger than the body width of age-0 Pacific lamprey. The suction of Pacific lamprey ammocoetes into the dredge nozzle intake could result in mechanical damage to the individuals as they move through the nozzle and over the sluice. • Displacement of ammocoetes would potentially increase the predation impacts to rearing Pacific lamprey. • Human foot travel on finer substrate deposits while working mining operations would increase stress to Pacific lamprey rearing in those locations.	Clearwater River, these areas would be excluded from the permit by Idaho Department of Water Resources for suction dredging.
4-9	The Nez Perce Tribe spends a substantial amount of resources restoring salmon and steelhead for the benefit of all citizens. These projects include habitat restoration projects in Musselshell Meadows and in tributaries to Lolo Creek. An acclimation site to the Nez Perce Tribal Hatchery is located on Yoosa Creek, a tributary to Lolo Creek where the proposed suction dredge mining is to occur. Significant numbers of spring chinook are released throughout Lolo Creek tributaries as part of the Tribe's comprehensive salmon recovery program. Suction dredge mining could negatively impact these significant restoration investments that total nearly $3 million.	The Forest Service supports the efforts by the Nez Perce Tribe to supplement spring-run chinook. The EIS notes that the dredging season occurs after the previous year brood offspring are out of the gravel and prior to current-year spawning. Therefore, impacts would be confined to displacement and avoidance during the hours of dredging activity, and seasonal reductions in macroinvertebrate food availability in dredged areas. The relatively small area affected --- and thus the small area from which chinook would be temporarily displaced and invertebrates would be reduced --- would severely limit these potential impacts.
4-10	Suction dredge mining interferes with ongoing efforts by tribal, state, and federal entities to restore and protect fisheries and water quality in Idaho because it results in increased deterioration of aquatic habitats and riparian areas. Studies indicate that suction dredging has serious impacts on water quality and fishery resources. *See* B. Harvey & T. Lisle, Scour of Chinook Salmon Redds on Suction Dredge Tailings, 19 N. Am. J. Fish. Manage. 613-617 (1999) (stating, "Our results show that fisheries managers should consider the potential negative effects of dredge tailings on the spawning success of (all-spawning fish, such as chinook salmon and coho salmon."); *see also* B. Harvey & T. Lisle, Effects of Suction Dredging on Streams: A Review and an Evaluation Strategy, 23	The cited conclusions by Harvey and Lisle are why this EIS has been prepared, so that the Forest Service can carefully consider the potential harmful impacts of small-scale suction dredging. The studies cited generally evaluate conditions from larger commercial suction dredge operations with 8-inch nozzle diameters. The impacts of the larger suction dredges is significantly greater than the small-scale 4 and 5 inch dredges analyzed in this EIS. Over the past decade and more, small-scale suction dredging in these creeks has not had any significant effect on aquatic habitats or riparian areas, and approval of future plans of operation would not result in any

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	Fisheries 8-20 (1998) (stating that, "Given the current level of uncertainty about the effects of dredging, where threatened or endangered aquatic species inhabit dredged areas, fisheries managers would be prudent to suspect that dredging is harmful to aquatic resources.").	more-significant effects.
4-11	Suction dredge activity will result in impacts to fisheries in the immediate area as well as areas downstream. These impacts include disruption and destruction of spawning, rearing, and feeding habitat, increased suspended sediment, and alteration of the streambed.	The EIS evaluates and discloses the potential impacts on fisheries noted by the commenter. The Biological Opinions of the U.S. Fish Wildlife Service and NOAA Fisheries concluded that suction dredging in compliance with specific measures would not jeopardize any species of concern. The terms and conditions of approval mirror and go beyond these reasonable and prudent measures. . (Term and Condition #3 and #6).
5-18	Dredging affects benthic invertebrates (especially mollusks which disperse slowly and mussels whose populations are currently unstable) and fish habitat (downed woody debris and spawning beds) (see Effects of Suction Dredging on Streams: a Review and an Evaluation Strategy, Harvey and Lisle 1998 in Fisheries, Vol. 23 No.8). Little research has been done on any aspect of dredging. There is almost no mention in the literature on extremely sensitive species like bull trout, which have narrower tolerances than salmon, steelhead, and even Westslope cutthroat. The DBIS generally assumes that since impacts are expected to be temporary, there is no real impact. This ignores the fact that dredging would take place in a time of year of stress, when water temperatures are elevated.	The EIS acknowledges that impacts do occur, but only during hours of operation during the mining season. While warm temperatures are critical for spawning, typical summer water temperatures are not known to be stressful to rearing juveniles. The terms and conditions include minimizing disturbance to the deep cool thalweg and pools. In addition, disturbance to riparian vegetation that may affect shading of the streams is minimized and monitored.
6-4	Concerns about steelhead just don't make sense at Moose Creek. The nearest Steelhead are probably 100 miles away. The gill nets (clear cuts of the river) and sports fishing even with barbless hooks kill many fish. It is doubtful that dredging will kill any fish. If turbidity standards are set and enforced dredging should not kill fish on the Lolo either.	The commenter is correct in pointing out that, because of the Dworshak Dam, there are no steelhead in Moose Creek, and this point is also made in the EIS. Also, operators must reduce or stop operations if noticeable turbidity is observed within 300 feet downstream of the suction dredge (condition 15).
6-5	Bull Trout should not be adversely effected by dredging either. Sports fishing which is catch and release for Bull Trout still kills fish. Even using barbless hooks as required in Moose and Kelly creeks kill fish. Probably 6% or more are killed when the water is warm. I have seen Bull Trout feeding in the same hole where a dredge was operating in Moose Creek. The dredging was stirring up food for them.	Thank you for your comment.
6-6	The USF&WS probably kills more Bull Trout and Steelhead with their water spills than any dredging. I have seen 3 pound Bull Trout injured or killed by these spills below Dworshak Dam and the nitrogen super saturation often exceeds the state limits which kills Steelhead.	Thank you for your comment.

Table D-2. Comments on the Draft EIS and Forest Service Responses

Commenter #	Comment	Response
7-7	"Dredging noise, activities in and near the streams that scare away fish, and the presence of non-tribal members may make for climate that is less than optimal for this traditional practice." [This] is not entirely correct. I have been diving in the Clearwater and the North Fork of the Clearwater River since 1960. I have found that fish will come up and look at you; I do not scare them at all. I have been snorkeling and hookah diving for the last four years while dredging. I have had all kinds of fish swimming in the same hole with me. Two years ago I was dredging around a big boulder, I was watching real close as I thought it might roll on me. All at once some[thing] hit me in the face and forehead I though[t] the boulder may have come loose and hit me. When I looked up it was a big salmon he stayed right in the hole with for two or three hours. I was tending the dredge one day, I looked up and there was a Tribal member standing looking under the dredge. He made the motion with his hands to show that there was a large salmon under the dredge. The salmon was looking a little worse for wear as he had already spawned several days before dredging season. (Reference: Page ES-17, 4-28)	Thank you for your comment.
8-1	The "acres" impacted on Moose Creek would not be 80% of the watershed, as stated on page 4-7 but would be considerably less.	The Forest Service agrees and has corrected the potentially affected area.
9-2	You should see this work [small-scale suction dredging] before they get started. ....[T]hey will kill lots of the small trout and then their operation will remove most of the food the small fish will have to eat.... They will damage the fish in all the area that they dredge.	The Forest Service has evaluated the impacts on trout and other fish. As noted in the EIS, most fish would vacate the immediate area. Intakes must have a 3/32-inch screen, which will preclude entrainment of most small fish. The EIS notes that aquatic insects and other food in the area being dredged will be reduced until it can recover, probably the following year. Because the area mined in any year is relatively small, the number of small fish potentially-affected would be similarly small.
11-7	The statement, "Dredging noise, activities in and near the streams that scare away fish, and the presence of non-tribal members may make for a climate that is less than optimal for this traditional practice." is not entirely correct. I am not a fish biologist or scientist, however I have over 30 years experience with a snorkel observing fish while I dredged. Dredging does not scare fish. I have had cutthroat trout become so complacent with my activities that one in particular let me pet (him) on several occasions. People have caught fish while I was working as well as I have caught several fish in my dredge holes before they were reclaimed. My	Thank your for your comment. The Forest Service also has observed some fish in the immediate vicinity of active suction dredges, perhaps to feed on the disturbed aquatic insects. Most fish, however, vacate the area while dredging, as noted in the EIS.

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Commenter #	Comment	Response
	first experience was on Newsome creek when a very large salmon swam between my legs to enter my dredge hole. The sight of this large green speckled thing inches from my mask was very startling to me not the fish. It didn't seem to have any effect on (him) as I leaped out of the hole. Many dredgers as well as myself have witnessed fish resting in the shade of the dredge while it was running. (Reference to page: ES-17, 4-28)	
Fisheries (section 4.4) and Noise (section 4.12)		
4-12	The noise associated with dredge motors and mining activities may disrupt certain fishery behaviors in the immediate area of these activities. Fish may need to locate other habitat in the drainage to spawn, rear, or feed.	Suction dredging may displace adult Chinook in the immediate vicinity of operations during the hours of operation. Chapter 4 of the EIS makes the same conclusion. Term and condition #7 restricts operations to daylight hours (EIS, Section 2.1).
Instream Habitat (section 4.5)		
5-19	The DEIS admits that no EAWS has yet been prepared for Moose Creek. The Forest Service is required to complete a watershed analysis prior to approving actions such as the proposed suction dredging operations. A watershed analysis is required by several Biological Opinions, including the Biological Opinion for the implementation of Forest Plans as Amended by INFISH and PACFISH. USFWS 1998. Because the watershed analysis results provide crucial data needed to adjust the Plan of Operations, this step must precede the approval of any mine operations: "Based on watershed analysis results the USFS should adjust proposed plans of operation or, if necessary, prohibit mining operations to prevent degradation of the ecological processes and functions and adverse effects to listed salmon and designated critical habitat" (NMFS Biological Opinion on LRMPs. 1995).	The Forest Service believes the terms and conditions with which operators must comply are sufficient "to prevent degradation of the ecological processes and functions and adverse effects to listed salmon and designated critical habitat." The Forest Service notes that the terms and conditions are based on reasonable and prudent measures stipulated by NOAA Fisheries and the USFWS, which concluded that small-scale suction dredging would not jeopardize any listed species. The Biological Opinions (i.e., NOAA Fisheries) noted that "...the USFS and BLM will submit to NMFS a schedule for the completion of at least one watershed analysis (EAWS) per management unit per year beginning in 1999 and each year thereafter". The Forest has sent a schedule for all 60 designated EAWS areas across the Forest to NOAA Fisheries and USFWS. The Forest has completed at least one EAWS per year since 1999. Lolo Creek was completed in 2003. Due to other areas on the Forest that have pending issues, Moose Creek was not one of the highest priority areas.
Wildlife (section 4.8)		
5-20	The wildlife analysis in the DEIS assumes there are no wolves or lynx in the area. The DEIS modifies this somewhat. Wolves are known from both Lolo Creek and the Moose Creek area. Lynx habitat is based upon an arbitrary 4,000 foot figure that has not gone through NEPA analysis. Case law has rejected FS lynx analysis based on lack of compliance with NEPA.	This comment is not clear, in that the first sentence states the DEIS assumes there are no wolves or lynx in the area, while the second sentence says the "...DEIS modifies this somewhat." Regardless, the EIS and the biological appendix state that both drainages are within the central Idaho non-essential population area for the gray wolf, with increasing sightings/tracks in the Lolo watershed. The wildlife appendix states that lynx habitat is primarily boreal (not exclusively boreal), and that the project creek bottomlands are not typical or suitable habitat. These factors, combined with no confirmed sightings in the vicinity of suction dredge operations, suggest very low potential for adverse impacts to these

Table D-2. Comments on the Draft EIS and Forest Service Responses

Commenter #	Comment	Response
		two species.
5-21	The assumptions that species such as the harlequin duck, wolverine, and northern leopard frog don't use riparian areas is ludicrous. Those species need water and the duck and frog are dependent upon riparian habitats.	The DEIS does not make such assumptions. Indeed, each of these species is specifically mentioned in Table 3-11: - Harlequin duck breeding "... has not been documented in the Clearwater National Forest, but a few sightings have been reported in the upper Lochsa River area and near the mouth of Papoose Creek (USDE 1997 from USDA 1995). There is a very low probability of occurrence in the project areas." - Northern leopard frogs: "There are no known or suspected occurrences of these frogs in the Clearwater National Forest." - Wolverine: "The riparian areas along the project creeks provide poor habitat and the level of human activity would preclude wolverine use in the affected area." The Forest Service notes that the human activity would not end if there were no suction dredging.
Vegetation (Section 4.9)		
4-13	Increased activity in the stream may result in concentrating people along reaches of the river. This may result in damage to the riparian vegetation. The concentrations of people associated with mining may result in the reduction of fish within these reaches due to loss of riparian vegetation.	Term and condition #25 requires a minimum spacing of 100 feet between suction dredge operations will reduce concentrating people along reaches. This and limiting the number of operations to 18 will minimize and reduce impacts to riparian vegetation. Even if suction dredging did not occur, the Forest Service expects that approximately the same level of camping by non-miners would occur, and approximately the same (very minor) effects on riparian vegetation would occur as well.

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Transportation		
5-22	Often, numerous poorly constructed roadways parallel and across streams to access mining claims. These routes can cause sedimentation of the adjacent streams due to associated gullying and landsliding prevent the growth of woody vegetation, important for the ecological functioning of RHCAs. Thomson and Lee found that density of juvenile Chinook salmon decreased as the geometric mean road density increased among surveyed streams in the Upper Columbia River basin. They suggest that road density exceeding 0.4 mile per mile squared is a significant issue in any watershed. In addition, the negative effects of roads on bull trout habitat and population survival are well established, and recognized throughout the scientific literature. Roads used to access mining claims also provide access for recreationists whose use and presence further degrade the function and purpose of RHCAs. The Roads Policy manual direction accompanying this rule identifies unclassified roads as unneeded, and further prohibits reconstruction of unclassified roads. The DEIS glosses over this important issue (see page 1-13). There is no travel plan prohibiting use of motorized equipment off Forest Service system roads. The concern is the cumulative effect of new routes being pioneered to drive dredge equipment next to streams.	Access to the stream will be restricted to existing Forest roads and trails. If additional access is proposed, then consultation will be reinitialted and the proposal will be analyzed in a separate environmental analysis.
Heritage Resources (section 4.14)		
5-23	The DEIS is unclear whether heritage surveys will be conducted, as requires by NEPA and the NHPA, prior to allowing these proposals to begin. Heritage sites are more frequent in riparian areas. In fact, some of the sites may be within or partially within streams themselves such as old mining ditches and other water diversion structures. How does the Forest Service intend to deal with old sites that may be within the highwater mark of the stream banks? Sites near water are usually more dense than those elsewhere and it is likely that many important sites could be within the substrate of stream banks and beds.	Compliance with Section 106 of the National Historic Preservation Act (NHPA), including SHPO consultation and archaeological survey of the area of potential effect (APE) of mining actions, would be completed prior to project initiation. Mitigation measures would be developed and implemented for sites eligible for the National Register of Historic Places that were identified within the project area that may be affected by mining actions.
Cumulative Impacts (section 4.16)		
3-8	Terms and Conditions designed to protect salmonid species will likely prove only modestly effective to protect rearing Pacific lamprey in Lolo Creek. The rearing habitat utilization and preference of the species is currently known in the South Fork Clearwater River drainage (Cochnauer and Claire 2000; Cochnauer and Claire 2001; Cochnauer and Claire 2002) and the same patterns are likely apply to the Lolo Creek drainage. Based on current knowledge, avoidance of dredging in stream sites with	Additional information regarding Pacific lamprey will be included in the EIS. In addition, the Idaho Department of Fish and Game will assist in the identification of potential lamprey spawning and rearing sites during the pre-project field review. Similar to suction dredging on the South Fork Clearwater River, these areas would be excluded from the permit by Idaho Department of Water Resources for suction dredging.

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	minimal velocities and substrates <5.0 mm in diameter will reduce the potential impacts to Pacific lamprey juveniles. Suction dredging operations in Lolo Creek are unlikely to affect adult Pacific lamprey as the spawning period is May and June.	The Forest Service notes that (as described in the EIS) the lowest gradient in Lolo Creek affected by suction dredge operations is classified as Rosgen C3 (low gradient cobble). The amount of sandy habitat (<6 mm) within the affected area ranges between 1.3 and 6.0 percent (Clearwater BioStudies 1999). Sands are not preferred by dredging operators. Even though Pacific lamprey rearing may exist in these areas and some of the sandy habitat may be dredged, the terms and conditions regarding pre-inspections of proposed dredge sites would alert operators regarding this habitat.
3-9	The DEIS addresses the legacy impacts from mining, timber harvest, road building and other past activities on Lolo and Moose Creek drainages in the cumulative impacts analysis. However, the DEIS does not assess the potential cumulative impacts that multiple new dredge mining permits might create over time. According to the DEIS, dredging activities could affect approximately 10% of each creek annually, apparently not including the 300' turbidity zone allowed downstream of each operation. The EIS should closely examine the additive and cumulative impacts of the proposed small-scale dredging activities over time, both separately and with respect to past dredge mining and other legacy impacts.	The terms and conditions for each permit adequately mitigate the seasonal impacts to aquatic habitat from small-scale suction dredging. Although a maximum of approximately 7 percent of Lolo Creek and about 10 percent of the Moose Creek project areas that are available for dredging could be impacted each year, natural changes to the creeks over 10.5 months per year, combined with the terms and conditions imposed for the 1.5 months/year for dredging operations, would not result in additive or cumulative impacts. The Forest Service will also be monitoring changes in stream morphology (as specified in the Biological Opinions) that may occur as a result of mining.
Compliance with Other Statutes and Regulations (Chapter 5)		
4-14	... without appropriate permits and analysis from the Environmental Protection Agency (EPA) and NOAA Fisheries, the Nez Perce Tribe is adamantly opposed to suction dredge mining on national forest lands.	The Forest Service agrees that EPA and NOAA Fisheries permits and/or analyses are needed. The Forest Service will approve proposed plans of operations only for applicants who have sought authorization for their discharges under the NPDES program. The terms and conditions with which all operators must comply (see Chapter 2) are based on the reasonable and prudent measures stipulated by State of Idaho BMPs, NOAA Fisheries (for anadromous fish species) and the U.S. Fish and Wildlife Service (for other threatened or endangered fish species).
4-15	Since November 1998, the Tribe has requested that the Idaho Department of Water Resources close off waters within the Nez Perce Reservation to suction dredge mining. In the interest of salmon and steelhead recovery, the Tribe has also requested waters throughout the Tribe's ceded territory be closed to suction dredge mining.	Both Moose Creek and Lolo Creek are closed to suction dredging under the State of Idaho's recreational permitting (one stop) process (IDWR Form 3804-A). This process (permit) is only used where formal consultation or NEPA are not required. Consultation is required for the project area and this EIS was prepared to evaluate impacts under NEPA. In these areas, dredgers will be required to have a State Stream Alternative Permit - Long Form (IDWR Form 3804-B) before the Forest Service will approve a POO.
4-16	Under section 402 of the Clean Water Act (CWA), suction dredgers must apply for and receive a permit from EPA under the National Pollution Discharge Elimination System (NPDES). Pollutants subject to these	The Forest Service will not approve any proposed plan of operations unless the operator has sought authorization to discharge under an NPDES permit.

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	permits under the CWA include "dredged spoil" such as that from a suction dredger. 33 U.S.C. § 1362(6). Further, the Ninth Circuit in *Rybachek* v. *EPA* specifically upheld EPA's regulation under the NPDES permit regime of placer mining in Alaska. 904 F.2d 1276 (9th Cir. 1990). We urge the Forest Service to not issue any mining permits until permittees first obtain an NPDES permit from EPA.	
4-17	Impacts to salmon and steelhead could constitute a "take" in violation of section 10 of the Endangered Species Act (ESA). NOAA Fisheries has consistently warned the State that they may be violating the ESA in issuing suction dredge permits. Federal courts have made it clear that a governmental entity with authority to regulate action that may take listed species could be held liable if threatened or endangered species are taken by a permittee without proper ESA authorization. *See Strahan V. Coxe*, 127 F.3d 155 (1st Cir. 1997). Similarly, the Forest Service could be in violation of the ESA until it completes formal section 7 consultation with NOAA Fisheries and the U.S. Fish and Wildlife Service (USFWS).	The Forest Service has completed formal Section 7 consultations with the Fish and Wildlife Service and with NOAA Fisheries. The 2006 Biological and Conference Opinion on effects of proposed Moose Creek suction dredging (dated March 7, 2006) was received by the Clearwater National Forest from Fish and Wildlife Service on March 2006. The NOAA Fisheries Biological Opinion on effects of Lolo Creek proposed suction dredging (dated April 28, 2006) was received by the Clearwater National Forest on April 2006.
4-18	The Nez Perce Tribe believes that suction dredge mining is inconsistent with salmon and steelhead recovery efforts. At a minimum, suction dredge mining must be in compliance with the Clean Water Act and Endangered Species Act before the Forest Service issues permits.	The Forest Service agrees that suction dredging must be conducted in compliance with the Clean Water Act and Endangered Species Act. The terms and conditions with which operators must comply are based on conservation measures recommended by the Fish and Wildlife Service and NOAA Fisheries as part of Endangered Species Act consultations; the Forest Service will not approve proposed plans of operation unless operators have sought authorization to discharge under an NPDES permit.
5-24	The mining claimants must also demonstrate that a right to mine, under the 1872 Mining Law, exists on each claim involved in the proposed mining operation prior to the initiation of disturbing activities. We raised this issue in our scoping comments and reiterate it now. This cannot be done with the blanket approval of some 29 plans of operations (or some 43 mining claims, DEIS page 1-1 or 66 proposals, DEIS page 2-1).	As noted in the Draft EIS, the Forest Service Policy on Mining of Public Domain Mineral Estate establishes that the Forest Service "... is not required to inquire into claim validity before processing and approving proposed plans of operations." The Forest Service emphasizes that the EIS does not provide "blanket approval" of any plans of operations. Rather, a Record of Decision accepting Alternatives 2 or 3 would allow the Forest Service to approve plans of operation if the operators agreed to comply with all of the terms and conditions listed in Chapter 2 of the EIS.
5-25	This project is located in Lolo and Moose Creeks. Lower Lolo Creek is listed as water quality limited segment under section 303(d) of the Clean Water Act (CWA) for several pollutants. Major tributaries to Moose Creek are also listed on the 303(d) list such as Osier Creek. Federal courts have expressly held that the outfall from in-stream placer mining equipment is a point source discharge under the CWA that cannot proceed without an NPDES permit. (Trustees for Alaska, 749 F.2d	See response to comment 1-1. The Forest Service will not approve plans of operations unless they are covered by an NPDES permit. Discharges from the dredges will have to comply with the TMDL that is developed; NPDES permits that authorize the discharges will require such compliance.

Table D-2. Comments on the Draft EIS and Forest Service Responses

Commenter #	Comment	Response
	539 (9th Cir. 1984). The DEIS acknowledges this fact but does not indicate how or whether the Forest Service will ensure this requirement has been met. (see next section in this comment) [comment 5-12].	
5-26	Furthermore, under the CWA, a new point source discharge affecting a parameter associated with the 303(d) listing is prohibited. This nondegradation standard applies since any new discharge affecting these parameters would by definition violate the requirement that: "existing instream water uses and the level of water necessary to protect the existing uses shall be maintained and protected." (40 CFR 131.12(a)(l). (Note: this antidegradation standard means that no degradation will occur--not some degradation can occur as long as the beneficial uses are protected and standards are met. See, PUD No.1 of Jefferson County v. Washington Department of Ecology, 114 S. Ct 1900(1994) While most of the sites appear to be outside 303(d) segments, assuming the map is accurate on the precise location of dredging activity, it is important to also keep in mind these streams don't meet forest plan standards.	See response to comment 5-13. Discharges from the dredges will have to comply with the TMDL that is developed; NPDES permits that authorize the discharges will require such compliance. The Forest Service acknowledges in the EIS that Lolo Creek does not currently meet the Forest Service plan standard for sediment. This "standard" a goal relating sediment yield from the watershed to land management practices, and is used for land planning and management. There is no relationship between this standard and Idaho water quality standards, which are related to turbidity and impacts to beneficial uses. Regardless, the EIS concludes that small-scale suction dredging will have no effect on sediment yield.
5-27	The Forest Service cannot approve the project before the information and data necessary for NPDES permits have been obtained. The DEIS does not make this clear, as noted above. Furthermore, the Forest Service cannot meet its duty under 36 CFR 228.8 to ensure that the project will comply with the CWA without an understanding of the specific nature of the discharges. As such, the Forest Service may be putting the cart before the horse in analyzing these proposals without more information and assistance of EPA in the matter of NPDES permits.	The DEIS states (page 5-4) that "[t]he Forest Service cannot approve proposed plans of operations unless the operator has sought coverage for its discharges under the NPDES program." The evaluation of potential impacts to water quality is presented in chapter 4.
5-28	The Court in Dubois ruled, "the Forest Service was obligated to assure itself that an NPDES permit was obtained before permitting the [requested activity]." (102 F3d at 1300). How will this be done? Specifically, what mechanisms will ensure that an NPDES permit is granted before dredge mining?	The Forest Service must receive a copy of an operator's NPDES permit for suction dredging in Moose Creek or Lolo Creek BEFORE their plan of operations can be approved.
5-29	This is an important concern as the DEIS states no new NEPA analysis is expected yet no decision is expected from this EIS process. This is a catch-22 that must be resolved.	As noted in the EIS and above, the ROD for this EIS will not approve any suction dredge plans of operations, either individually or collectively. Rather, the ROD would allow approval of individual plans of operations without further NEPA analysis only if they meet specified criteria. Proposed plans of operations in other areas and plans that do not meet the criteria will require a separate NEPA analysis before they could be approved.
5-30	The agency's duties under the ESA are not overridden by any "rights" the applicant may have under the 1872 mining law. The courts are clear in ruling that prohibitions under the ESA must be enforced, even to deny mining operation and: "of course, the Forest Service would have the authority to deny any unreasonable plan of operations or plan otherwise	The Forest Service has not taken the position that the Endangered Species Act is "overridden" by the Mining Law. The Forest Service must comply with both ESA and the 1872 Mining Law. Pertinent laws and regulation are listed in Chapter 5.

Table D-2. Comments on the Draft EIS and Forest Service Responses

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	prohibited by law. E.g., 16 V.S.C. 1538 (endangered species located at the mine site). The Forest Service would return the plan to the claimant with reasons for disapproval and request submission of a new plan to meet the environmental concerns." (Havasupai Tribe v. U.S., 752 F. Supp. 1471, 1492 (D. Az. 1990) affirmed 943 F2d 32 (9th Cir.1991) cert. denied 503 U.S. 959 (1992); This point is particularly valid in this instance as the dredging proposals would have profound impacts on water quality and TES species.	Further, the Forest Service agrees that it cannot approve any unreasonable plan of operations or plan otherwise prohibited by law." As stated in the EIS, any proposed plan of operations which does not comply with the specified terms and conditions will not be approved, pending modification of the plan or a separate NEPA and Endangered Species Act evaluation.
Other		
8-2	[The commenter is...] ...willing to work with the Forest Service.	Thank you for your cooperation.

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APPENDIX E

CONSULTATION AND COORDINATION COMMENTS PROVIDED BY INDIVIDUALS, ORGANIZATIONS, NEZ PERCE TRIBE OR AGENCIES

June 10, 2004 Re:04-025-AFS

Reply To
Attn Of: ECO-088

Vern Bretz
Clearwater National Forest
12730B Highway 12
Orofino, Idaho 83544

Dear Mr Bretz:

The U.S. Environmental Protection Agency has reviewed the draft Environmental Impact Statement (EIS) for the **Small-Scale Suction Dredging in Lolo Creek and Moose Creek Clearwater and Idaho Counties** (CEQ # 040141) in accordance with our responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act. Section 309, independent of NEPA, specifically directs EPA to review and comment in writing on the environmental impacts associated with all major federal actions and the document's adequacy in meeting NEPA requirements.

The EIS analyzes the No Action Alternative and two (2) action alternatives. Alternative 2 would approve Plans of Operations for potentially 18 suction dredge operators on Lolo Creek and potentially 38 suction dredge operators on Moose Creek. Alternative 2 and 3 include specified operating conditions and mitigation measures designed to protect threatened and endangered fish and their habitat. Alternative 3 also includes two stream improvement projects. The Forest Service has selected Alternative 3 as the Agency Preferred Alternative.

EPA generally supports the terms and conditions for dredging and we believe they are designed to protect fish habitat and seem to minimize the potential to damage stream channels and banks. EPA supports the provisions that the Forest Service has developed regarding timing and locations for dredge operations to minimize disruption of aquatic habitat. Also, we support the proposed monitoring discussed in the EIS that the Forest Service will conduct. However, EPA has concerns related to water quality and the lack of information regarding affected environment and cumulative effects.

EPA's water quality concerns relate to the potential number of simultaneous mining operations, turbidity, bedload impacts, and lack of site-specific information on effects of dredging. EPA believes that too many dredges operating at once could have potentially significant impacts on individual stream reaches. We recommend that the EIS address this concern and include contingency measures for unforseen circumstances. Also, EPA recommends that components of the alternatives be considered such as limiting the number of dredges operating at a time, limiting the hours of operation per day, and/or limiting the amount of material each dredge could process.

EPA believes that certain areas within the EIS warrant further discussion. We believe that the EIS should discuss the proposed 303 (d) listing of Lolo Creek and how the TMDL will drive future management decisions once developed. We recommend that the EIS have additional discussion on potential bedload impacts, include additional information on cumulative impacts

on water quality and aquatic habitat related to historic, currently proposed, and reasonably foreseeable future mining and include these discussions in the EIS.

For the above reasons, we have assigned a rating of EC-2 (Environmental Concerns - Insufficient Information) to the Alternative 3, the Preferred Alternative. This rating and a summary of our comments will be published in the Federal Register. A copy of the rating system used in conducting our review is enclosed for your reference.

Thank you for the opportunity to review this draft EIS. If you would like to discuss these issues, please contact Lynne McWhorter at (206) 553-0205 or feel free to contact me at (206) 553-6911.

Sincerely,

(Signed by Jonathan Freedman for)

Judith Leckrone Lee, Manager
Geographic Unit

Enclosure

Subject: Small-Scale Suction Dredge In Lolo Creek and Moose Creek. Clearwater and Idaho Counties Draft Environmental Impact Statement

bcc: Author File
Reading File
Official File
GIU Manager Reading File

cc: J. Werntz, IOO

Date: June 10, 2004
Format: WordPerfect 9
File Name: g::\nepa\afs\04-025-AFS Cover Letter Small Scale Suction Dredging Lolo and Moose Creek Clearwater Nat Forest.wpd

Concurrences		
Surname	McWhorter	Lee
Initials		
Date		

Keep with Official File Copy

EPA's Detailed Comments
on Small-Scale Suction Dredging in Lolo Creek and Moose Creek
Clearwater and Idaho Counties, Idaho

WATER QUALITY

It is unclear how the instantaneous IDEQ turbidity standard (background turbidity shall not be increased by more than 50 NTU) relates to the proposed requirement that visible plumes shall not extend more than 300 feet downstream. The EIS should explain how many NTUs are equivalent to a visible plume. This information is necessary in demonstrating that the operations would meet water quality standards.

Page 2-12 EPA recommends that the EIS discuss whether or not the loss of relative stream bed stability is possible in areas which have been mined.

Page 3-7 The EIS states that Lolo Creek does not meet the Forest Plan sediment standard. The EIS should further discuss this issue by stating the source of sediment and how this standard relates to Idaho State standards.

Page 3-11 Discussion of temperature criteria should also include the Idaho salmonid spawning criteria, and the federal bull trout criteria.

Page 3-45 Table 3-18. The percent substrate composition of particles in the sand size and smaller differ substantially between this table and 3-7 and 3-6 for Moose Creek and Independence Creek, respectively. Table 3-7 and 3-6 show much higher levels of fine material, and are based on a more recent (2003) reference. The EIS should indicate which is more representative of current conditions.

Sediment load

Page 2-7 The text should clarify that the Idaho ambient turbidity standard is ≤25 NTU above background for 10 consecutive days, and not to exceed 50 NTU above background (IDAPA 58.01.02.250.02.e).

Page 2-8 "These data show that sediment production in Lolo Creek is meeting State water quality standards and beneficial uses for steelhead trout and cutthroat trout as listed in the Forest Plan for the Lolo Creek watershed (USFS 1987)." We agree that the turbidity data indicate compliance with the turbidity criteria cited above, however, Idaho also has a narrative sediment standard which indicates that sediment shall not be present in quantities which will impair beneficial uses (IDAPA 58.01.02.200.08). This provision can account for impacts from other forms of sediment not captured by the turbidity criteria, such as excessive bedload. Since Idaho is planning to list Lolo Creek for sediment in the project area, this section should be revised to indicate that while data show compliance with turbidity criteria, Idaho has determined that sediment is impairing beneficial uses. Idaho has not completed a similar assessment of the Moose Creek drainages for 303(d) purposes.

Page 4-2 Section 4.1.2 indicates that sediment would not increase in the study areas, but substrate sediment would be dredged and then settle out within a short distance. We believe other aspects of this sediment movement need to be addressed to make this discussion complete. The EIS does not provide information to substantiate what a "short distance" is, nor whether all size fractions of sediment will settle out in a short distance. Coarse sands and gravels likely would settle out quickly, but sand size material may contribute to increased bedload movement, and finer fractions (silts and clays) could be transported much greater distances downstream. We recommend further addressing this concern and avoiding dredging up silts and clays and if these are encountered that the dredging process should cease to operate and move to another location.

Page 4-2 We are concerned that while the sediment which is moved is part of the existing stream bed, it is being introduced into the water column at a time of the year (summer) when elevated water column and bedload sediment loading typically does not occur. Given the low flows at this time, sediment in the water column will not be diluted by higher flows, and bedload sediment will be less likely to be flushed from the system. Furthermore, dredging into the substrate several feet and/or to bedrock may be below the typical scour depth from high spring flows. Sediment dredged up from such depths would only be exposed by typical stream flow infrequently, rather than annually during the dredge season. EPA recommends providing additional discussion regarding this concern.

Page 4-3 Water Quality Effects, Alternative 2. As stated in the previous comment, sediment introduced by dredging is atypical in that it occurs at a time of year when normally it would not, and a greater depth of sediment may be liberated than would normally occur during annual high flows. The ambient turbidity criteria cited in this section is correct, but Idaho water quality standards also include a treatment technique for point sources, which specifies that point source discharges must not increase turbidity by more than 5 NTU above background outside the mixing zone (IDAPA 58.01.02.401.03.b). This treatment requirement was included as part of the wasteload allocation for suction dredging in the SF Clearwater TMDL (IDEQ, Nez Perce Tribe, USEPA, 2003), and should be cited as a relevant standard in the EIS.

Page 4-3 The EIS states, "These extremely and localized and temporary increases would not be significant compared to the background total sediment loads of 1,541 and 500 pounds per day in July and August …" We estimated what the combined fine sediment ($\leq$2 mm) loading would be in each stream assuming each facility was operating, each was discharging 5 yd^3/day, and average stream flows for July – Aug. In Table 1 below, we compared this to average suspended sediment loading measured in these streams from Tables 3-4, 3-13, 3-14, and 3-15, averaging the July – August readings.

Table 1

Stream	# Operations	Estimated Loading from Dredges	Historical Measurements	
		Fines < 2 mm (lb/day)	Suspended Sediment (lb/day)	Total Sediment (lb/day)
Lolo Creek	18	30,579	1,020	1,369
Indepenence Creek	6	35,284	80	352
Moose Creek	6	20,125	3,193	3.320
Deadwood Creek	6	21,954	88	534

As can be seen, the estimated potential volume mobilized from these facilities is up to 30,000 pounds per day or more, far greater than that which has been measured historically, and raises serious concerns about cumulative impacts of both suspsended sediment and bedload movement. While these values may not be strictly comparable, they do provide a sense of the relative magnitude of potential sediment movement from the dredges compared to historical measurements of sediment movement in the stream. This is of particular concern given the large number of facilities which could operate, and during the very low flows which occur in these streams in July-August. While the likelihood that all these facilities will operate simultaneously may not be high, it is not a worst case scenario. Under current IDWR rules, each facility may discharge up to 2 yd^3/hour. Assuming each facility is operated 8 hour/day, they would discharge 16 yd3 of material vs. 5 yd3/day used in the estimates above. Further, the EIS indicates that 38 facilities could operate in the Moose Creek drainage. We estimated loading for only 26 facilities shown in Figure 2-2. The additional 12 facilities not shown in the figure would increase the estimated sediment loading shown in the table above.

The EIS should consider these possibilities, and offer alternatives or strategies to address the potential consequences.

Page 4-7 The EIS suggests that measurable indirect effects from turbidity and sediment would occur within 100 meters, based on work by Royer, 1999. While we don't dispute the findings of Royer's work on the Fortymile River in Alaska, the rivers in which he evaluated sediment impacts were 70 – 80 meters wide. It would be difficult to extrapolate results from this work to the Lolo and Moose Creek given the signficant difference in stream flow and stream power. We recommend that data from other studies locally at a smaller scale be used, or that site specific information be developed to evaluate downstream sediment impacts from dredging

303 (d) list

Page 3-2 "Lolo Creek has not been identified as having any water quality concerns within the

project area." In 2003, Idaho proposed to include Lolo Creek in the Idaho 303(d) list from the source to Yakus Creek for: bacteria, nutrients, oil/grease, dissolved oxygen, sediment, and temperature[1]. The segment from Yakus Creek to the mouth was proposed to be listed for sediment. These listings will remain in the final 2002 303(d) list which is expected to be submitted to EPA in the near future (personal communication, IDEQ, 5/14/04). IDEQ plans to develop a TMDL for Lolo Creek in 2005. The fact that segments of Lolo Creek in the project area will be listed for sediment and other pollutants should be identified in the EIS. USFS decisions regarding these dredges may need to be revised in the future depending upon the outcome of the TMDL

Page 4-9 The EIS mentions that dredging could produce synergistic effects in streams with elevated temperature. As mentioned previously, Idaho is planning to add Lolo Creek to the 303(d) list for temperature in the reach in question, so it would be worth further evaluating these impacts to establish whether operating conditions described in Chapter 1 are adequately protective.

FISH IMPACTS
ES-9 The EIS should provide more detailed information related to westslope cutthroat trout similar to the other Threatened and Endangered species.

Page 4-8 We agree that the July 1 – Aug 15 time window avoids most of the major salmonid spawning windows, but we are concerned that sediment mobilized during this time may effect spring chinook spawning in Lolo Creek which would occur immediately after the dredging season ends.

TERMS AND CONDITIONS
Condition 4 states that if streambanks are disturbed, they must be restored but it isn't until Condition 10 that it says that streambanks shouldn't be disturbed at all. These 2 conditions should be one after the other with #10 first.

Condition 12 says that operators have to maintain a 100 foot separation distance but Condition 15 says that they have to visually monitor 300 feet downstream. The EIS should explain how the 300 foot distance will be determined by the operators. It would seem that it would be difficult to discern between one operator's turbidity plume and another's. For example, what if one dredger were operating and his turbidity plume disappeared within 100 feet but another dredger was operating 110 feet away and had a turbidity plume 300 feet long - it would still be within the first dredgers 300 feet but he would have no control over it. It would seem that the length of the monitored reach should be the same as the spacing distance between dredges.

The EIS should explain what happens if conditions are found that were not expected. There are at least a couple of possibilities here. One possibility is that an operator does not abide by the

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[1]IDEQ, Nez Perce Tribe, USEPA, 2004. South Fork Clearwater Subbasin Assessment and Total Maximum Daily Loads. Idaho Department of Environmental Quality, Nez Perce Tribe, U.S. Environmental Protection Agency. March 2004.

agreed-upon conditions. The EIS states that the Plan of Operations will not be renewed the following year. Is there an option to withdraw the permission mid-season? A second possibility is that while all operators abide by the conditions, the amount of disturbance is greater than predicted for some reason. The EIS should consider these scenarios and have a contingency plan in order to be prepared for unforseen circumstances.

MONITORING
EPA suports the commitment by the Forest Service to conduct five inspections during the season and to do a final evaluation at the end of the season. This provides important assurance that any impacts that do occur are not likely to go unnoticed. The proposed mitigation projects included in Alternative 3 will restore important habitat in these reaches.

EPA recommends collecting data upstream and downstream from some active dredges during the low-flow season to quantitatively evaluate the amount of turbidity that results from dredging (both individually and cumulatively). Although the DEIS predicts that the operations have no significant impact, the conclusion is based on a line of evidence rather than any measured information. Site-specific data would be very useful in the near future when TMDLs are done and when NPDES permits are developed.

EPA recommends that past monitoring of suction dredge operations in these or similar watersheds in the Clearwater basin be brought into th EIS to better clarify their potential impacts.

RESTORATION
The EIS states that streams will be restored to original condition by the end of the field season. The EIS should explain how this will be evaluated and how the operators or Forest Service will determine if the next pool downstream has been reduced in volume? Also, the EIS should explain how any pools deepened by dreding will be filled back to the original level.

ALTERNATIVES
Page 1-11 To further minimize the impacts from suction dredge operations, other Alteratives which the USFS might want to consider include limiting the number of operations on each stream, limiting the number which could operate at any given time, further limiting the size of dredge or hours/day in which they could operate, or simply limiting the amount of material each dredge could process.

The lack of site specific data makes it particularly difficult to evaluate dredge impacts. One option the USFS may want to consider is to allow only a very limited number of dredges to be operated in each of these streams in the next few years. During that time detailed monitoring could be carried out to better evaluate impacts from these facilities. This would allow some of the operators to resume mining, would provide the USFS better information on which to evaluate and possibly permit other facilities, and could provide very useful information for the upcoming TMDL and NPDES permitting process.

The EIS should state who will conduct the restoration in Alternative 3.

CUMULATIVE IMPACTS

Although the conditions of the permit appear good, we are concerned that there has not been a more thorough evaluation of the cumulative impacts of these operations on the sediment loading, particularly given the number of facilities which could potentially operate at one time, and given the very low flows which could occur during the July-August operating season. While we recognize that typically not all applicants operate each year, the analysis should evaluate this scenario, since by definition these permits could allow it to occur, and increasing gold prices may make it more likely.

CORRECTIONS AND FURTHER RECOMMENDATIONS

EPA recommends including a table that clearly lists each stream and whether or not they are meeting State water quality standards and Forest Plan standards for each criteria.

Page 3-7 A reference is made to USFS 2001e, which was not found in the reference list.

Page 3-9 Typographical error based on September bedload rates, change as follows: "... bedload ranges between 5 percent and ~~48~~ 61 percent ..."

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
500 NE Multnomah Street, Suite 356
Portland, Oregon 97232-2036

IN REPLY REFER TO:

ER04/0268

May 11, 2004

Mr. Larry Dawson
Forest Supervisor
Clearwater National Forest
12730B Highway 12
Orofino, Idaho 83544

Re: COMMENTS – Review of Draft Environmental Impact Statement for the Small-Scale Suction Dredging in Lolo Creek and Moose Creek, Clearwater and Idaho Counties, Idaho

Dear Mr. Dawson:

The Department of the Interior has reviewed the Draft Environmental Impact Statement for the Small-Scale Suction Dredging in Lolo Creek and Moose Creek, Clearwater and Idaho Counties, Idaho. The Department does not have any comments to offer.

We appreciate the opportunity to comment

Sincerely,

Preston A. Sleeger
Regional Environmental Officer

IDAHO FISH & GAME
CLEARWATER REGION
1540 Warner Avenue
Lewiston, Idaho 83501-5699

Dirk Kempthorne / Governor
Steven M. Huffaker / Director

May 17, 2004

Mr. Larry Dawson, Forest Supervisor
Clearwater National Forest
12730B Highway 12
Orofino, Idaho 83544

Dear Mr. Dawson:

RE: SMALL-SCALE SUCTION DREDGING IN LOLO CREEK AND MOOSE CREEK DRAFT ENVIRONMENTAL IMPACT STATEMENT

Thank you for the opportunity to review the Draft Environmental Impact Statement for Small-Scale Dredging in Lolo Creek and Moose Creek (DEIS).

Large scale dredging activities in the Clearwater River drainage have historically contributed and currently contribute to suppression of Chinook salmon, steelhead trout, bull trout, and Pacific lamprey populations. Effects of small-scale suction dredging activities are generally of a lesser magnitude than effects of large-scale operations; however, the potential impacts warrant careful consideration of the activities in light of the total number of permits anticipated in Lolo Creek (18) and Moose Creek (38) annually. Dredging activities in Lolo Creek drainage could have both long- and short-term adverse impacts on rearing and spawning habitat, and other stream attributes necessary to sustain spring Chinook salmon, steelhead trout, bull trout, westslope cutthroat trout, and Pacific lamprey. Suction dredge activities in Moose Creek drainage are most likely to adversely affect bull trout and westslope cutthroat trout.

Potential impacts of suction dredging, even at a small scale, include but are not limited to:

1. Mechanical damage to salmon, steelhead, trout, Pacific lamprey, and other species fry, eggs, and larvae.
2. Resuspension of instream sediments which may deposit in reaches where salmon, steelhead, Pacific lamprey, and other species spawning occurs.
3. Destabilization of conglomerated substrates resulting in stream channel destabilization processes through increased bedload transport.
4. General disturbance and or displacement of rearing aquatic species due to dredging and associated activities.

5. Direct alteration of stream habitats (i.e. creation or elimination of pools, movement of stream gravels, etc.).
6. Spill of toxic fuels and fluids associated with the dredging operations.

Some, but not all, of these impacts are addressed in the DEIS.

Terms and Conditions: Provisions for protecting fish and aquatic habitat are addressed in the "Terms and Conditions" (EIS 2.2 to 2.7) that will be required of all dredge operators. We believe that the required "Terms and Conditions" for operations will be generally protective of bull trout and steelhead, if adequately implemented and enforced. However, we do have some concerns about those Terms and Conditions. In particular, we are concerned that the protections are limited to those species. The Terms and Conditions (except the additional Terms and Conditions under Alternatives 2 and 3, which are intended to meet ESA requirements) should also extend protections to other species, especially Chinook salmon, westslope cutthroat trout and Pacific lamprey. Our comments on specific Terms and Conditions below reflect that premise.

Our specific concerns regarding some of the Terms and Conditions are:

#3. Dredge sites must be located in areas of large substrate not preferred for spawning steelhead and bull trout.

- Dredge sites should not be located in areas used for and suitable for spawning, not just those "preferred" by steelhead and bull trout.
- Dredge sites should also be prohibited in areas used for spawning by westslope cutthroat trout or in substrates used/suitable for Pacific lamprey for spawning or rearing.
- Since the impacts of dredging can be expected to extend beyond the actual area of dredging (*e.g.,* 300' sediment/turbidity zone), the "dredge site" should be defined to include both the area where suction dredging will occur *and* 300' downstream for the purpose of protecting habitat downstream.

#12. Operators must maintain a minimum spacing of at least 100 linear feet . . . between suction dredging operations. How does this spacing affect the 300' turbidity condition outlined in #14; who will decide which operator is responsible for excessive discharges when discharges are cumulative; and how will cumulative loads be managed?

#14. Operators must visually monitor the stream for 300 feet downstream of the dredging operation . . . and cease immediately or decrease in intensity until no increase in turbidity is observed 300 feet downstream. We do not believe a "visual" assessment is a suitable means to assess water quality impacts of dredging. It is also unlikely that visual observations are adequate to satisfy state water quality requirements. Provisions should be made to measure turbidity daily and to respond immediately if standards are not met at the point of discharge.

#22. Dredging operations must be shut down immediately if fish eggs are excavated, if sick, dead, or injured steelhead or bull trout are observed, or if destruction of redds is observed.

- We agree with the requirement to shut down and report any of the above impacts to fish. Again, however, we recommend that the same protective conditions should apply for Chinook salmon, westslope cutthroat trout and Pacific lamprey.
- Since operators may not recognize 'sick' fish, we recommend immediate shutdown and reporting if fish appear "distressed" or show any unusual behavior.
- Will operators be trained or tested to ensure that they can identify eggs and larvae in their excavated material, or to differentiate between various fish species, including eggs, larvae and juveniles of various species?
- The permitting process should allow no opportunity for destruction of redds. We recommend a requirement for a qualified fish biologist to survey potential dredge mining sites, including the 300' downstream allowable turbidity zone, for redds prior to permitting and start-up of operations. Monitoring should continue throughout operations to ensure no redds are compromised by dredging or sediment discharge.

 # 24. Dredging operations must be shut down immediately if the operator observes bull trout in either creek or steelhead in Lolo Creek.

- Will operators be trained, tested to ensure that they are able to identify bull trout, including juveniles, as well as other species the Terms and Conditions are designed to protect?
- Operations should also be shut down if someone <u>other than</u> the operator reports a valid observation of bull trout in either creek or steelhead in Lolo Creek.

As you have probably noted, we are also concerned that monitoring of conditions of operation and decisions to cease operations seem to be left primarily to the operator. Monitoring to meet many of the conditions (*e.g.,* occurrence of redds, identification of suitable spawning habitat, identification of juvenile salmonids) requires special training or qualifications that operators are not likely to possess. We believe that frequent, nearly continuous, oversight of operations by qualified Forest Service biologists may be necessary to ensure successful implementation of the Terms and Conditions.

<u>Additional Comments:</u>

Steelhead Trout: (EIS, ES-8) The DEIS underrates the wild/natural steelhead trout production potential in Lolo Creek. Steelhead trout were present in 207 of the 214 mainstem locations sampled in Lolo Creek, indicating widespread usage of the creek (EIS, 3-14, Table 3-9). Additionally, during Pacific lamprey sampling in the Lolo Creek drainage in 2004, Idaho Department of Fish and Game identified several hundred (total) age-0 and greater than fifty (total) age-1+ steelhead dispersed in multiple mainstem reaches. Steelhead trout spawning is known to occur in the Lolo Creek Snake Bite Placer Claim reach -- one completed steelhead trout redd was observed in this reach in 2004. This observation reinforces the need for to survey for redds and steelhead presence prior to initiation of suction dredging in the reach. The greatest potential impacts of suction

dredging in the Lolo Creek drainage are disturbance of rearing juveniles and displacement of spawning gravels. Preventing dredging in suitable spawning gravels will avoid the latter.

Bull Trout: (EIS, ES-8) We anticipate that the primary impacts of suction dredge operations in the Moose Creek drainage would be disturbance of rearing bull trout and alterations of spawning and rearing habitat structure. A potential thirty-eight suction dredge operations annually in the drainage will undoubtedly displace rearing bull trout, as well as potential prey species. It is impossible for the USFS suction dredging "Terms and Conditions" (EIS, 2-2 to 2-7) to effectively limit this impact; therefore, this impact deserves greater review in the DEIS. Although the "Terms and Conditions" should protect spawning habitat and may adequately protect the morphological structure of the Moose Creek bull trout rearing habitat, the deconsolidation of substrates (estimated to exceed 380 m^3 in the basin annually from suction dredge operations) could exacerbate current channel instability linked to previous mining activities. This potential impact should is not fully reviewed in the DEIS.

Westslope Cutthroat: (EIS, ES-9) The impacts of suction dredging to westslope cutthroat *O. clarki lewisi* in Lolo Creek and Moose Creek are expected to mirror those of other species; however, the distribution and abundance of the cutthroat is greater in both drainages than other salmonids and Pacific lamprey, potentially providing a buffer for human activities. It is essential, however, that suction dredge activities are closely held to the USFS "Terms and Conditions" to ensure cutthroat trout populations, including current distributions, remain intact in the two drainages.

Pacific Lamprey: Impacts of suction dredging to Pacific Lamprey were not addressed in the DEIS. Pacific lamprey are considered in precipitous decline in Idaho and the species throughout the Pacific Northwest range was petitioned for federal Endangered Species Act listed protection in January 2003.

Suction dredging in Lolo Creek will likely impact Pacific lamprey to a greater degree than other species. Pacific lampreys occupy the substrates and organic debris depositional locations in stream channels for an estimated 4-7 year rearing period prior to transformation and migration to the estuary and ocean. Suction dredge activities potentially will result in mechanical damage to age-0 Pacific lamprey through adduction into the intake.

- The USFS suction dredge intake requirement of 3/32 is larger than the body width of age-0 Pacific lamprey. The suction of Pacific lamprey ammocoetes into the dredge nozzle intake could result in mechanical damage to the individuals as they move through the nozzle and over the sluice.
- Displacement of ammocoetes would potentially increase the predation impacts to rearing Pacific lamprey.
- Human foot travel on finer substrate deposits while working mining operations would increase stress to Pacific lamprey rearing in those locations.

Terms and Conditions designed to protect salmonid species will likely prove only modestly effective to protect rearing Pacific lamprey in Lolo Creek. The rearing habitat utilization and preference of the species is currently known in the South Fork Clearwater River drainage (Cochnauer and Claire 2000; Cochnauer and Claire 2001; Cochnauer and Claire 2002) and the same patterns are likely apply to the Lolo Creek drainage. Based on current knowledge, avoidance of dredging in stream sites with minimal velocities and substrates <5.0 mm in diameter will reduce the potential impacts to Pacific lamprey juveniles. Suction dredging operations in Lolo Creek are unlikely to affect adult Pacific lamprey as the spawning period is May and June.

Cumulative Impacts: The DEIS addresses the legacy impacts from mining, timber harvest, road building and other past activities on Lolo and Moose Creek drainages in the cumulative impacts analysis. However, the DEIS does not assess the potential cumulative impacts that multiple new dredge mining permits might create over time. According to the DEIS, dredging activities could affect approximately 10% of each creek annually, apparently not including the 300' turbidity zone allowed downstream of each operation. The EIS should closely examine the additive and cumulative impacts of the proposed small-scale dredging activities over time, both separately and with respect to past dredge mining and other legacy impacts.

Preferred Alternative: Three Alternatives were considered; No Action, Suction Dredging, and Dredge Mining and Stream Improvement Projects. IDFG supports your selection of Alternative 3 as the Preferred Alternative, which would permit dredging under stringent controls outlined in the Terms and Conditions, and includes some watershed restoration as well.

Thank you for the opportunity to comment.

Sincerely,

Cal Groen

Cal Groen
Clearwater Regional Supervisor

CG/rh/ss

c: Tracey Trent
Christopher Clair
Nathan Brindza

Nez Perce

TRIBAL EXECUTIVE COMMITTEE
P.O. BOX 305 • LAPWAI, IDAHO 83540 • (208) 843-2253

May 12, 2004

Larry Dawson, Forest Supervisor
Clearwater National Forest
12730B Highway 12
Orofino, ID 83544

RE: Comments on the Suction Dredging Draft EIS

Dear Mr. Dawson:

The Nez Perce Tribal Executive Committee (NPTEC) submits these comments on the draft environmental impact statement (DEIS) for the project entitled, "*Small-Scale Suction Dredging in Lolo Creek and Moose Creek Clearwater and Idaho Counties, Idaho*" (hereinafter referred to as the suction dredge mining project).

As you know, the Nez Perce Tribe has been in close coordination with staff from NOAA Fisheries to analyze and minimize the effects of suction dredge mining on fish, water quality, and fish habitat. Therefore, the comments transmitted in this letter are less of a technical nature and more of a restatement of tribal policy and legal position with respect to this project. As such, it should come as no surprise to you that without appropriate permits and analysis from the Environmental Protection Agency (EPA) and NOAA Fisheries, the Nez Perce Tribe is adamantly opposcd to suction dredge mining on national forest lands.

Suction Dredge Mining Impairs Salmon and Steelhead Recovery

Since November 1998, the Tribe has requested that the Idaho Department of Water Resources close off waters within the Nez Perce Reservation to suction dredge mining. In the interest of salmon and steelhead recovery, the Tribe has also requested waters throughout the Tribe's ceded territory be closed to suction dredge mining.

The Nez Perce Tribe spends a substantial amount of resources restoring salmon and steelhead for the benefit of all citizens. These projects include habitat restoration projects in Musselshell Meadows and in tributaries to Lolo Creek. An acclimation site to the Nez Perce Tribal Hatchery is located on Yoosa Creek, a tributary to Lolo Creek where the proposed suction dredge mining

is to occur. Significant numbers of spring chinook are released throughout Lolo Creek tributaries as part of the Tribe's comprehensive salmon recovery program. Suction dredge mining could negatively impact these significant restoration investments that total nearly $3 million.

Suction dredge mining interferes with ongoing efforts by tribal, state, and federal entities to restore and protect fisheries and water quality in Idaho because it results in increased deterioration of aquatic habitats and riparian areas. Studies indicate that suction dredging has serious impacts on water quality and fishery resources. *See* B. Harvey & T. Lisle, Scour of Chinook Salmon Redds on Suction Dredge Tailings, 19 N. Am. J. Fish. Manage. 613-617 (1999) (stating, "Our results show that fisheries managers should consider the potential negative effects of dredge tailings on the spawning success of fall-spawning fish, such as chinook salmon and coho salmon."); *see also* B. Harvey & T. Lisle, Effects of Suction Dredging on Streams: A Review and an Evaluation Strategy, 23 Fisheries 8-20 (1998) (stating that, "Given the current level of uncertainty about the effects of dredging, where threatened or endangered aquatic species inhabit dredged areas, fisheries managers would be prudent to suspect that dredging is harmful to aquatic resources.").

Specifically, the Tribe is concerned with the following impacts to fisheries, which need to be analyzed by the Forest Service:

> The noise associated with dredge motors and mining activities may disrupt certain fishery behaviors in the immediate area of these activities. Fish may need to locate other habitat in the drainage to spawn, rear, or feed.
>
> Increased activity in the stream may result in concentrating people along reaches of the river. This may result in damage to the riparian vegetation. The concentrations of people associated with mining may result in the reduction of fish within these reaches due to loss of riparian vegetation.
>
> Suction dredge activity will result in impacts to fisheries in the immediate area as well as areas downstream. These impacts include disruption and destruction of spawning, rearing, and feeding habitat, increased suspended sediment, and alteration of the streambed.
>
> Mining activity disturbs the creek bed, suspending sediment and causing large amounts of benthic organisms to artificially drift downstream.

<u>Clean Water Act Permit Required</u>

Under section 402 of the Clean Water Act (CWA), suction dredgers must apply for and receive a permit from EPA under the National Pollution Discharge Elimination System (NPDES). Pollutants subject to these permits under the CWA include "dredged spoil" such as that from a suction dredger. 33 U.S.C. § 1362(6). Further, the Ninth Circuit in *Rybachek v. EPA* specifically upheld EPA's regulation under the NPDES permit regime of placer mining in Alaska. 904 F.2d 1276 (9th Cir. 1990). We urge the Forest Service to not issue any mining permits until permittees first obtain an NPDES permit from EPA.

Considerations under the Endangered Species Act

Impacts to salmon and steelhead could constitute a "take" in violation of section 10 of the Endangered Species Act (ESA). NOAA Fisheries has consistently warned the State that they may be violating the ESA in issuing suction dredge permits. Federal courts have made it clear that a governmental entity with authority to regulate action that may take listed species could be held liable if threatened or endangered species are taken by a permittee without proper ESA authorization. *See Strahan v. Coxe*, 127 F.3d 155 (1st Cir. 1997). Similarly, the Forest Service could be in violation of the ESA until it completes formal section 7 consultation with NOAA Fisheries and the U.S. Fish and Wildlife Service (USFWS).

Sediment/Mercury Impacts

On February 13, 2004, North Fork District Ranger Doug Gober met with tribal staff from our Fisheries Department and Natural Resources Department to discuss a series of projects, including this suction dredge mining project. Visual observation of excess turbidity at 300 feet down stream is too subjective. The levels should be quantified with instrumentation on quantitative analysis. The cumulative impact of multiple miners working on concurrent sections of the creeks also makes this self regulation potentially unworkable. The criterion of ceasing operations if two drops of mercury are discovered is too subjective. This criterion should be changed to any visible mercury. Fine grained sediment should be discharged on the bank in settling ponds.

Monitoring & Enforcement of Terms and Conditions

The Forest Service must ensure that each of the terms and conditions contained in the biological opinions are strictly adhered too. This will require the Forest Service to adequately fund an aggressive monitoring and enforcement program to ensure that permittees are adhering to the terms and conditions. If the Forest Service discovers violations of the terms and conditions, the Forest Service should immediately revoke the suction dredge mining permit.

In addition to permit monitoring and enforcement, the Forest Service needs to aggressively conduct biological monitoring to ensure that the terms and conditions do not negatively impact fish, water quality, or fish habitat. The Tribe remains concerned about the Forest's ability to conduct such biological monitoring, given the recent trends to cut back such funding.

The Tribe hereby requests participation in all monitoring efforts. I understand that the Forest Service is proposing a pre-mining tour, as well as five (5) monitoring trips during operations. The Tribe also requests to receive all future monitoring reports related to this project. Please coordinate these monitoring requests with Scott Althouse and Heidi McRoberts in the Watershed Division.

Bonding Requirement

Due to the high biological risks associated with suction dredge mining, the Tribe urges the Forest Service to require all permittees to post a bond before beginning operations. The bond should be

significant, nothing less than $1000. The Tribe welcomes further discussion on bonding, and how the Forest Service might use the bonding fee to fund monitoring and enforcement.

Conclusion

The Nez Perce Tribe believes that suction dredge mining is inconsistent with salmon and steelhead recovery efforts. At a minimum, suction dredge mining must be in compliance with the Clean Water Act and Endangered Species Act before the Forest Service issues permits.

Sincerely,

Anthony D. Johnson
Anthony D. Johnson
Chairman

cc Dale Brege, NOAA Fisheries

May 17, 2003

Larry Dawson, Forest Supervisor
Vern Bretz, Forest Geologist
Clearwater National Forest
12730B Highway 12
Orofino, ID 83544

RE: Small Scale Suction Dredging in Lolo Creek and Moose Creek, Clearwater and Idaho Counties, Idaho

Dear Supervisor Dawson and Mr. Bretz:

The following comments on the Lolo Creek and Moose Creek placer dredging are submitted on behalf of Friends of the Clearwater, Idaho Conservation League, the Ecology Center, the Lands Council, Idaho Sporting Congress, Alliance for the Wild Rockies, Idaho Rivers United, and the Palouse Group of Sierra Club.

Introduction

The scoping letter indicated that this proposal covered 16 proposals in Lolo Creek and 13 in Moose Creek. Now, the DEIS says it apparently covers 17 claims on Lolo Creek and 26 on Moose Creek. Why the change?

Does this DEIS cover any proposal for suction dredge mining in the area covered by the analysis? There is still no clear indication whether suction dredging could occur in others streams. That is particularly true of the Moose Creek proposals which flow into Kelly Creek and then the North Fork Clearwater. The Big Game Habitat Restoration and a Watershed Scale (BHROWS) document indicates that the North Fork, from Kelly Creek to Beaver Creek, and all of its tributaries in that section, except Weitas Creek, are open to suction dredging. These pose a major threat to water quality and fisheries.

The mining claimants must also demonstrate that a right to mine, under the 1872 Mining Law, exists on each claim involved in the proposed mining operation prior to the initiation of disturbing activities. We raised this issue in our scoping comments and reiterate it now.

This cannot be done with the blanket approval of some 29 plans of operations (or some 43 mining claims, DEIS page 1-1 or 66 proposals, DEIS page 2-1). There also must be effective monitoring and enforcement of the rules and regulations governing mining at each mine site and assurance that each of the claimants has the proper permits and licenses before initiation of the mining operation. Frankly, we question whether and how the agency can enforce the provisions proposed under various alternatives such as if fish eggs are evacuated or mercury is discovered (see DEIS chapter 2).

Finally, we raised several issues in our scoping comments that were listed but not addressed in the DEIS (pages 1-11 to 15). As such, many of the concerns addressed in the scoping letter remain.

NEPA Issues/Purpose and Need

A major purpose of NEPA is to evaluate a reasonable range of alternatives. However, the DEIS ducks this issue by failing to look at an alternative that withdraws the habitat for listed species from mineral entry (DEIS page 2-9). The agency cannot so narrowly define the purpose and need as to preclude a meaningful analysis of other alternatives.

Furthermore, the refusal to do separate NEPA analysis for each proposal not only fails to comply with NEPA's requirements for site-specific analysis, it adds considerable confusion to the process. The District Ranger could approve suction dredge mining years after completion of this EIS without any NEPA analysis at all. It seems that in order to review this decision at higher levels, citizens who own the national forest, would be required to challenge this document. Yet, the DEIS notes any ROD emanating from this EIS would not approve any proposed action (2-9). A clearer statement of policy is needed as it appears many decision memos or other non-challengeable decisions would emanate from this EIS and no ROD would be prepared. Is that accurate? If so, it violates not only NEPA but the Appeal Reform Act as well.

The DEIS is unclear whether the current plans of operations (POOs) are sufficient to meet the requirements of the DEIS proposed on page 2-27. The FOIA response sent to Friends of the Clearwater indicates none of the POOs explicitly mention the 30 conditions in the DEIS. Does the agency maintain that new POOs will need to be submitted before allowing suction dredging to occur?

Existing Environmental Conditions and Environmental Impacts and Concerns

Here the DEIS fails to address issues we raised in our scoping letter. In particular, monitoring current conditions would be important to see what the impacts of suction dredging are on the Clearwater National Forest. For example, camping in one place beyond 14 days and the impacts of repeatedly loading the dredge from the trailer or pick-up in and out of the streams.

Often, numerous poorly constructed roadways parallel and across streams to access mining claims. These routes can cause sedimentation of the adjacent streams due to associated gullying and landsliding prevent the growth of woody vegetation, important for the ecological functioning of RHCAs. Thomson and Lee[1] found that density of juvenile Chinook salmon decreased as the geometric mean road density increased among surveyed streams in the Upper Columbia River basin. They suggest that road density exceeding 0.4 mile per mile squared is a significant issue in any watershed. In addition, the negative effects of roads on bull trout habitat and population survival are well established, and recognized throughout the scientific literature[23]. Roads used to access mining claims also provide access for recreationists whose use and presence further degrade the function and purpose of RHCAs. The Roads Policy manual direction accompanying this rule identifies unclassified roads as unneeded, and further prohibits reconstruction of unclassified roads.

The DEIS glosses over this important issue (see page 1-13).. There is no travel plan prohibiting use of motorized equipment off Forest Service system roads. The concern is the cumulative effect of new routes being pioneered to drive dredge equipment next to streams.

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[1] Thompson, W. L. and D. C. Lee. Modeling relationships between landscape-level attributes and snorkel counts of Chinook salmon and steelhead parr in Idaho. Can. J. Fish. Aquat. Sci. 57:1834-1842.

[2] Lee, D.C., J.R. Sedell, B.E. Rieman, R.F. Thurow, J.E. Williams and others. 1997. Broadscale assessment of aquatic species and habitats. Pp. 1057-1496, In: T.M. Quigley and S.J. Arbelbide, tech. eds. As assessment of ecosystem components in the interior Columbia Basin and portions of the Klamath and Great Basins. USDA Forest Service, Pacific Northwest Research Station. PNW-GTR-328. Portland, OR.

[3] Baxter, C. V., C. A. Frissell and F. R. Hauer. 1999. Geomorphology, logging roads, and the distribution of bull trout (Salvelinus confluentus) spawning in a forested river basin: implications for management and conservation. Transactions of the American Fisheries Society 128:854-867.

It also seems some of the proposed dredge sites (see figure 2-4) are within the Moose Mountain Roadless Area (see Clearwater Forest Plan Appendices, C-102). This fact is overlooked in the DEIS. Since Deadwood Creek is the boundary of the roadless area, Lobo, Golden Goose, MAC 1, PB 1, and Katerons Folly, appear within the inventoried roadless area.

Water Quality

This project is located in Lolo and Moose Creeks. Lower Lolo Creek is listed as water quality limited segment under section 303(d) of the Clean Water Act (CWA) for several pollutants. Major tributaries to Moose Creek are also listed on the 303(d) list such as Osier Creek.

Federal courts have expressly held that the outfall from in-stream placer mining equipment is a point source discharge under the CWA that cannot proceed without an NPDES permit. (Trustees for Alaska, 749 F.2d 539 (9th Cir. 1984)). The DEIS acknowledges this fact but does not indicate how or whether the Forest Service will ensure this requirement has been met. (see next section in this comment).

Furthermore, under the CWA, a new point source discharge affecting a parameter associated with the 303(d) listing is prohibited. This nondegradation standard applies since any new discharge affecting these parameters would by definition violate the requirement that: "existing instream water uses and the level of water necessary to protect the existing uses shall be maintained and protected." (40 CFR 131.12(a)(1)). (NOTE: this antidegradation standard means that no degradation will occur--not some degradation can occur as long as the beneficial uses are protected and standards are met. See, PUD No. 1 of Jefferson County v. Washington Department of Ecology, 114 S.Ct 1900(1994)). While most of the sites appear to be outside 303(d) segments, assuming the map is accurate on the precise location of dredging activity, it is important to also keep in mind these streams don't meet forest plan standards.

The Forest Service is prohibited by the CWA (section 313) from permitting any activity that may violate water quality standards. Since the proposed project will discharge pollutants into the river and due to the fact these streams don't meet all fishery and water quality standards, the activity should not proceed.

While the impacts of dredging, including fine sediments released by dredging, are not well known (see Effects of Suction Dredging on Streams: a Review and an Evaluation Strategy, Harvey and Lisle 1998 in Fisheries, Vol. 23 No. 8), it is known that dredging increases sediment. Many of these streams do not meet standards that reflect sediment such as cobble embeddedness. The bears this out.

However, it should be noted the DEIS is not clear on whether the Moose Creek area meets cobble embeddedness parameters. The DEIS notes that Lolo Creek doesn't, but there is no similar analysis or charts for Moose Creek.

WATBAL is used to analyze impacts to the watersheds. WATBAL described watersheds devastated by the landslides in 1995 and 1996 as recovered. Until recently, the WATBAL model was never peer-reviewed in a scientific journal. However, a recent peer-reviewed study of WATBAL by Hickey (1997) has documented that the WATBAL model consistently underestimates the amount of sediment actually reaching streams. (Hickey, R. 1997. Evaluating the WATBAL Sediment Loading Model, Clearwater National Forest, Idaho. Northwest Science, Vol. 71, No. 3, p. 233.)

Furthermore, WATBAL seems designed for projects other than suction dredging. Such an activity is unique in that it disturbs the actual stream bed itself. While technically suction dredging may not add anything that is not already in the stream itself, the impacts of taking material from the stream bed and redistributing it in the stream must be considered. WATBAL is not formulated to do that. As such, it is an inappropriate model.

One last issue regarding water quality is very important. The Clearwater National Forest Plan Settlement agreement does not permit activities that would increase measurable sediment in areas where forest plan water quality standards are not being met. This specific issue is not addressed directly in the DEIS in this context (see chapter 5).

NPDES Permit

The Forest Service cannot approve the project before the information and data necessary for NPDES permits have been obtained. ((Dubois v. U.S. Dept. of Agriculture, 102 F3d 1273 (1st Cir. 1996)). The DEIS does not make this clear, as noted above. Furthermore, the Forest Service cannot meet its duty under 36 CFR 228.8 to ensure that the project will comply with the CWA without an understanding of the specific nature of the discharges. As such, the Forest Service may putting the cart before the horse in analyzing these proposals without more information and assistance of EPA in the matter of NPDES permits.

The Court in Dubois ruled, "the Forest Service was obligated to assure itself that an NPDES permit was obtained before permitting the [requested activity]." (102 F3d at 1300). How will this be done? Specifically, what mechanisms will ensure that an NPDES permit is granted before dredge mining?

This is an important concern as the DEIS states no new NEPA analysis is expected yet no decision is expected from this EIS process. This is a catch-22 that must be resolved.

TES Species

Dredging affects benthic invertebrates (especially mollusks which disperse slowly and mussels whose populations are currently unstable) and fish habitat (downed woody debris and spawning beds) (see Effects of Suction Dredging on Streams: a Review and an Evaluation Strategy, Harvey and Lisle 1998 in Fisheries, Vol. 23 No. 8). Little research has been done on any aspect of dredging. There is almost no mention in the literature on extremely sensitive species like bull trout, which have narrower tolerances than salmon, steelhead, and even Westslope cutthroat.

The DEIS generally assumes that since impacts are expected to be temporary, there is no real impact. This ignores the fact that dredging would take place in a time of year of stress, when water temperatures are elevated.

Furthermore, the conditions do not guarantee no harm to fish or other aquatic organisms. They are based upon the assumption that the conditions will be followed. It expects dredge miners are experts in fisheries (items 3, 615, and 24) and expects them to notice tiny fry or alevins and notice if mercury is displaced (items 22 and 29). All the above is difficult even where operators are trying to comply. Other conditions are subjective in nature.

The agency's duties under the ESA are not overridden by any "rights" the applicant may have under the 1872 mining law. The courts are clear in ruling that prohibitions under the ESA must be enforced, even to deny mining operation and: "of course, the Forest Service would have the authority to deny any unreasonable plan of operations or plan otherwise

prohibited by law. E.g., 16 U.S.C. 1538 (endangered species located at the mine site). The Forest Service would return the plan to the claimant with reasons for disapproval and request submission of a new plan to meet the environmental concerns." (Havasupai Tribe v. U.S., 752 F.Supp. 1471, 1492 (D. Az. 1990) affirmed 943 F2d 32 (9th Cir. 1991) cert. denied 503 U.S. 959 (1992); See also Pacific Rivers Council v. Thomas, 873 F.Supp. 365 (D. Idaho 1995): Pacific Rivers Council v Thomas, 30 F.3d 1050 (9th Cir 1994) cert. denied 115 S.Ct. 1793 (1995)). This point is particularly valid in this instance as the dredging proposals would have profound impacts on water quality and TES species.

The wildlife analysis in the DEIS assumes there are no wolves or lynx in the area. The DEIS modifies this somewhat. Wolves are known from both Lolo Creek and the Moose Creek area. Lynx habitat is based upon an arbitrary 4,000 foot figure that has not gone through NEPA analysis. Case law has rejected FS lynx analysis based on lack of compliance with NEPA.

The assumptions that species such as the harlequin duck, wolverine, and northern leopard from don't use riparian areas is ludicrous. Those species need water and the duck and frog are dependent upon riparian habitats.

Mining Claim Validity

Before rejecting the no-action alternative under NEPA, the agency is obligated to ensure that the public's resources are not being jeopardized by actions pursuant to invalid mining claims. The DEIS erroneously asserts that mining claim validity is not an important issue (page 2-11) and quotes a policy paper not included in the bibliography under the citation, USFS 2003g. Furthermore, it appears that so-called policy is neither statute or regulations promulgated as part of the code of federal regulations. As such, the DEIS does not support its contention that mining claim validity is not an issue.

It is very doubtful that all the subject claims contain a "valuable mineral deposit" under the 1872 mining law. In fact, the DEIS admits that there is little gold recovery and for many dredging is not an economic enterprise. Rather, it is a recreational endeavor.

It is law that the mining "rights" relied upon by the agency can only be based on the discovery of a "valuable mineral deposit" on each claim to be used by the applicants. (30 U.S.C. 22). The Forest Service cannot presume that the filing of a mining claim means that the claim is valid (i.e. that the "rights' relied upon by the applicant are rights at all). A mining claim location does not give presumption of a discovery. (Ranchers Exploration v. Anaconda). "[L}ocation is the act or series of acts whereby the boundaries of the claim are marked, etc., but it confers no right in the absence of discovery, both being essential to a valid claim." (Cole v. Ralph, 252 U.S. 286, 294-96 (1920)).

The Department of the Interior also has rules that "rights" to develop federal land do not arise without a discovery:

> The essential conclusion that a mining claim cannot be valid without a discovery has been restated by the courts as well as the Department. "Discovery is the sine quo non of an entry to initiate vested rights against the United States." (Davis v. Nelson, 329 F2d 840, 845 (9th Cir. 1964)); ". . . that discovery is the prerequisite to the validity of a mining claim cannot be disputed.") Fresh v. Udall, 228 F.Supp. 738, 740 (D. Colo. 1964)).

(U.S. v. Bartels, 6 IBLA 126, 127 (1972)).

The IBLA also noted that since each claim must contain a valuable mineral deposit, "the recovery expected from each claim must not only exceed the costs of mining, transporting, milling, and marketing the particular mineral deposit on that claim but each claim must also bear a proportionate share of the development and capital costs attributable to the combined operation." (U.S. v. Collord, 128 IBLA 266, 287-288 (1994)). The DEIS clearly does not make this case.

The inherent value alone of a deposit is not enough to sustain its value; the claimant must presently, and at all relevant times, be able to extract, process and market the deposit at a profit. U.S. v. Coleman, 390 U.S. 599 (1968). *See also* In re Pacific Coast Molybdenum Co., 90 ID 352 (1983) (mineral deposit must be presently marketable at a profit to be valid). As the Court in Coleman states: "Minerals which no prudent man will extract because there is no demand for them at a price higher than the cost of extraction and transportation are hardly economically valuable." 390 U.S. at 602, 603.

Coleman's Marketability Test applies to all mining claims and is part of the "Prudent Person Test" the courts have historically applied to ascertain the validity of mining claims. Converse v. Udall, 399 F.2d. 616 (9th Cir. 1968) *cert. denied,* 89 S. Ct. 635 (1969). The Court in Converse also stated that the profitability of a proposed mining venture is one of the main components of a valid discovery: "[T]he nucleus of value which sustains a discovery must be such that with actual mining operations under proper management a profitable venture may reasonably be expected to result." Id. at 623.

It must be remembered that the test focuses on the prudent **person**, not the prudent miner, and certainly not the claimant. As the Supreme Court stated in the seminal case of Chrisman v. Miller: "The facts which are within the observation of the discoverer, and which induce him to locate, should be such as would justify a man of ordinary prudence, not necessarily a skilled miner, in the expenditure of his time and money in the development of the property." 197 U.S. 313, 322-323 (1905) *quoting* Lindley on Mines § 336 (1st ed.). The Interior Secretary has stated: "It is thus evident that the willingness of a mining claimant, grounded only in the hope of success, to expend time and money in further efforts to develop a mine will not suffice." U.S. v. Nevitt, A-30030 (July 28, 1964). As the IBLA stated:

> Finally, the "Prudence" to which reference is made in the "prudent man test" first articulated in *Castle v. Womble*, is measured by the probability of developing a valuable mine as determined by an ordinary man with knowledge and understanding of all of the facts; not by the degree of prudence which a particular claimant exercises in the conservation of his individual economic means. U.S. v. Mortensen, 7 IBLA 123, 126 (1972).

Furthermore, the Interior Department requires that the costs of compliance with environmental regulations be factored into the validity determination. (United States v. Pittsburgh Pacific, 30 IBLA 388 (1977); Leshy, The Mining Law, (Resources for the Future, 1987); United States v. Kosanke Sand Corporation, 80 IBLA 538, 546-547 (1973)). As the Board in Pittsburgh Pacific recognized, environmental cost factors may be significant enough to "stand in the way of a profitable mining operation" and therefore, must be addressed by the claimant. Id. at 393.

The limited evidence in the DEIS leads one to conclude none of these proposals meet these requirements. It must be stressed that any argument by the Forest Service that a discussion of claim validity is beyond the scope of the issues would violate the Administrative Procedures Act. Clearly, a document so fundamentally based on an incorrect and

insupportable position is arbitrary and capricious, an abuse of discretion, without observance of procedure required by law, not in accordance with law, and not supported by facts. (5 U.S.C. 706(2)).

Since the federal government can review and challenge the validity of any mining claim at any time (Cameron v. U.S., 252 U.S. 450(1920)), it must inquire into these issues at the outset as part of its NEPA and 36 CFR 228 review processes. This inquiry is also required to the Forest Service's duty under the Organic Act, prior to approval of an operation.

This is not a case where the issue of claim validity would be a needless exercise. The economic section of the DEIS notes there is considerable uncertainty whether a "valuable mineral deposit" exists at each site. The DEIS does not give any expected revenues from gold production. The DEIS merely notes only one prospector relies on suction dredging as a sole source or even major source of income. Thus, it is highly doubtful that the revenues from recreational suction dredging activities sufficiently outweigh all of the necessary costs so as to have sufficiently profitable operations.

The Forest Service cannot restrict its authority based on incorrect and insupportable assumptions that the claim(s) on the site contain a valuable mineral deposit under the mining laws. The agency's duty to protect the surface resources under the ESA, NFMA, and the 228 regulations, as well as its duty to make informed decisions under NEPA, would be violated by such an action.

Although the Forest Service cannot categorically deny a reasonable plan of operations, **it can reject an unreasonable plan and prohibit mining activity** until it has evaluated the plan and imposed mitigation measures." Siskiyou Regional Education Project v. Rose, 87 F. Supp. 2d 1074 (D. Or. 1999)(emphasis added).

Bonding/Financial Assurance

Under 36 CFR 228, the agency should require a financial assurance that ensure that reclamation would be completed in the event of abandonment of the site. This is especially critical due to the problematic economics of gold recovery. The DEIS fails to detail the amount, scope, and form of the financial assurance. None of the 30 conditions address bonding.

Watershed Analysis

The DEIS admits that no EAWS has yet been prepared for Moose Creek. The Forest Service is required to complete a watershed analysis prior to approving actions such as the proposed suction dredging operations. A watershed analysis is required by several Biological Opinions, including the Biological Opinion for the implementation of Forest Plans as Amended by INFISH and PACFISH. USFWS 1998. Because the watershed analysis results provide crucial data needed to adjust the Plan of Operations, this step must precede the approval of any mine operations:

> Based on watershed analysis results, the USFS should adjust proposed plans of operation or, if necessary, prohibit mining operations to prevent degradation of the ecological processes and functions and adverse effects to listed salmon and designated critical habitat (NMFS Biological Opinion on LRMPs, 1995).

Heritage Values

The DEIS is unclear whether heritage surveys will be conducted, as requires by NEPA and the NHPA, prior to allowing these proposals to begin. Heritage sites are mmore frequent in riparian areas. In fact, some of the sites may be within or partially within streams themselves such as old mining ditches and other water diversion structures.

How does the Forest Service intend to deal with old sites that may be within the highwater mark of the stream banks? Sites near water are usually more dense than those elsewhere and it is likely that many important sites could be within the substrate of stream banks and beds.

Sincerely,

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Moscow, ID 83843

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Lynn B. Card
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Home Phone 208 476 5394
Email lynncard@clearwater.net

April 16, 2004

District Ranger, North Fork Ranger District
District Ranger, Lochsa Ranger District
Clearwater National Forest
12730 Highway 12
Orofino, Idaho 83544

Attention Vern Bretz: 1950/2810 (Moose Creek/Lolo Creek Dredging)

This letter is in response to your request for issues, concerns or questions about the proposed "Moose Creek/Lolo Creek small-scale dredging DEIS," mining project. The following are my comments:

1. I agree gold is needed. A quick look at the spot metals market shows gold at or near record levels. If they can't make money mining now they probably never will. Prospecting is needed to confirm that there is commercial quantities of gold present to mine.

2. The high value of gold also presents a opportunity to restore , reclaim and repair past mistakes.

3. We will need to limit the number of people that can mine at any one time. Establish a mining season and shut down mining when stream levels get very low.

4. For the most part this is recreational mining. This is a valued use of national forest and part of multiple-use. Just like hunting, fishing, back-packing or skiing. This keeps people especially retired people occupied and busy.

5. Concerns about steelhead just don't make sense at Moose Creek. The nearest Steelhead are probably 100 miles away. The gill nets (clear cuts of the river) and sports fishing even with barbless hooks kill many fish. It is doubtfull that dredging will kill any fish. If turbidity standards are set and enforced dredging should not kill fish on the Lolo either.

6. Bull Trout should not be adversely effected by dredging either. Sports fishing which is catch and release for Bull Trout still kills fish. Even using barbless hooks as required in Moose and Kelly creeks kill fish. Probably 6% or more are killed when the water is warm. I have seen Bull Trout feeding in the same hole where a dredge was operating in Moose Creek. The dredging was stirring up food for them.

7. The USF&WS probably kills more Bull Trout and Steelhead with their water spills than any dredging. I have seen 3 pound Bull Trout injured or killed by these spills below Dworshak Dam and the nitrogen super saturation often exceeds the state limits which kills Steelhead.

Thank you for including these ideas in your analysis. Please pass copies of this letter to the Districts as needed.

Sincerely,

Lynn B. Card

From: Vern Beretz [vbretz@fs.fed.us]
Sent: Friday, April 16, 2004 12:36 PM
To: mozingoj@saic.com
Subject: Lynn Card comments Small-Scale Suction Dredging DEIS

----- Forwarded by Vern Bretz/R1/USDAFS on 04/16/2004 12:33 PM -----

---

"Lynn Card"
lynncard@clearwater.net

04/15/2004 11:21 AM

To: "Vern Bretz" vbretz@fs.fed.us
Cc:
Subject: Moos/Lolo Dredging DEIS

Attached are my comments for this project.
Lynn Card (See attached file: EMC#1claim.rtf)

Comments for EIS Draft:

9/16/2004

1. In several places the DEIS states that the stream will be reclamated *by* the end of the mining season. Small Scale Miners, reclaim their dredge holes as they move forward until they reach the last hole or when we have to move to another area. Then we turn the dredge around and dredge the hole full or back as close to grade as possible. I would like to urge that we be given at least *one day* after the season is over, to reclaim where we have worked.

   Reference to page: ES-6, ES-7, 2-5,2-15, 3.1.2 item 21

2. Dredging noise, activities in and near the streams that scare away fish, and the presence of non-tribal members may make for climate that is less than optimal for this traditional practice." Is not entirely correct.

   I have been diving in the Clearwater and the North Fork of the Clearwater River since 1960. I have found that fish will come up and look at you; I do not scare them at all. I have been snorkeling and hookah diving for the last four years while dredging. I have had all kinds of fish swimming in the same hole with me. Two years ago I was dredging around a big boulder, I was watching real close as I thought it might roll on me. All at once some hit me in the face and forehead I though the boulder may have come loose and hit me. When I looked up it was a big salmon he stayed right in the hole with for two or three hours. I was tending the dredge one day,
   I looked up and there was a Tribal member standing looking under the dredge. He made the motion with his hands to show that there was a large salmon under the dredge. The salmon was looking a little worse for wear as he had already spawned several days before dredging season.

   Reference: Page ES-17, 4-28

3. Under the terms and Conditions in section 2 and under 3.0 Environmental Consequences,

   Item 8 should read, "All human waste must be kept more than 200 feet away from any live water *or as approved by the Forest Service.* It is the policy as a member of NorthWest Gold Prospectors Association, Clearwater Chapter, to rent porta-potties and put them on or near the dredge sites. Also most of us have travel trailers or motor homes that are self contained and can be taken into Pierce or Weippe to be dumped, there is also a porta-potty at the campsite.

4. Table 2-1, Mitigation Measures lists the intakes having a 2/32 screen. It should read 3/32.

5. In the Environmental Consequences "Item 9 under the Terms and Conditions; should start with *"NO".*

   I do support alternative 3. I would like to suggest that you let the miners remove the logs that were put in to make spawning beds. All they are now is *silt* traps. This would reclaim more spawning beds. The Fish and Game have been doing the same thing and this way we can extract the gold.

Del DuPont
Rt. 2 Box 807
Kamiah, Idaho
Ph: (208) 935-0873
E-Mail: idaminer@cybrquest.com
Co-Owner of D&M #1 and D&M #2

From: Vern Beretz [vbretz@fs.fed.us]
Sent: Thursday, April 22, 2004 7:34 AM
To: mozingoj@saic.com
Subject: DEIS

----- Forwarded by Vern Bretz/R1/USDAFS on 04/22/2004 07:33 AM -----

---

"Del DuPont"
<idaminer@cybrquest.com>

04/21/2004 10:10 AM

To: <Undisclosed-Recipient:;@fs.fed.us;>
cc:
Subject: DEIS

Hi Vern; find attached my comments on the DEIS.
Del

Outgoing mail is certified Virus Free.
Checked by AVG anti-virus system (http://www.grisoft.com).
Version: 6.0.663 / Virus Database: 426 – Release Date: 4/20/2004 (See attached file: 4202004_Commits to DEIS.doc)

PHONE CONVERSATION: Ron Hartig with Vern Betz - Clearwater NF Suction Dredging DEIS - Comments.

May 17, 2004
0900 hrs

Ron stated that he is all for the completion of the EIS. He pointed out that page 4-7 "acres impacted" on Moose Creek would not be 80% of the watershed. He felt it would be considerably less.

Ron said he would be willing to work with the Forest Service.

/s/ Vern Betz

Bennie W. Janes
208 E Tremont St
Dayton, WA 99328-1549

Mr DOUG GOCHNOUR
CLEARWATER NATIONAL FOREST
12730 HIGHWAY 12
OROFINO, IDAHO 83544

83544+9333

①

Dear Doug
A note to say I got the Third Quarter Clearwater National forest NEPA Quarterly Report and I have 2 questions on Environmental Policy of the Mining that is to take place on the Small Rivers to take place from this July to mid August. I do not Know If you have seen these type of operation, If not you Should See how this works before they get Started, First they will Kill lots of the small trout then this operation will remove most of the food the Small fish will have to eat by this Suction Dredging, They

Will Damage the fish in all the area that they Dredge. If you Don't Believe what I tell you just talk to a Jones person on this matter. I would say ok on this project If no fish were in the area they would were Dredging, But If any fish are their then no mining should be Alowd.

Sincerly
Bennie W. Jones

PS.
Doug you might show this letter to Mr Terry & Dawson also

Rod Neumann
9033 Grandmason
Eagle, Id.
83616

RECEIVED
APR 14 2004
CLEARWATER NF

Larry Dawson
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Orofino, Id.
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Larry I go along
with alternative #3
forest Services choice
don't see any problems
(good report)

Boulder Beach #2

Rod Neumann
9033 GrandMason
Eagle, Id.
83616

Phone # 1-208-867-1800

COMMENTS DRAFT EIS

4/16/04

1. The DEIS states in several places that the stream will be reclamated *by* the end of the mining season. In most cases we fill in our holes behind us as we dredge, however I urge that we be given at least one day *after* the season is over to reclaim where we have worked.

   Reference to page: ES-6, ES-7, 2-5, 2-15, 3.1.2 item 21

2. The statement, "Dredging noise, activities in and near the streams that scare away fish, and the presence of non-tribal members may make for a climate that is less than optimal for this traditional practice." is not entirely correct.

   I am not a fish biologist or scientist, however I have over 30 years experience with a snorkle observing fish while I dredged. Dredging *does not scare fish.* I have had cutthroat trout become so complacent with my activites that one in particular let me pet (him) on several occaisions. People have caught fish while I was working as well as I have caught several fish in my dredge holes before they were reclaimed. My first experience was on Newsome creek when a very large salmon swam between my legs to enter my dredge hole. The sight of this large green speckled thing inches from my mask was very startling to me not the fish. It didn't seem to have any affect on (him) as I leaped out of the hole. Many dredgers as well as myself have witnessed fish resting in the shade of the dredge while it was running.

   Reference to page: ES-17, 4-28

3. Under the Terms and Conditions in section 2 and under 3.0 Environmental Consequences,

   Item 8 should read "All human waste must be kept more than 200 feet away from any live water *or as approved by the Forest Service."*

   Item 18 should change to: "Operators may not remove, relocate, or disturb stable in-stream woody debris or *remove* boulders greater than 12 inches in diameter. Also under 4.2.2, 4.5.2, 3.2.2

   Under the monitoring and reporting by the Forest Service as outlined in the Terms and Conditions in section 2 and under 3.0 Environmental Consequences, 3.2.2,

   Item 1 specifies that the FS monitor operations five times during the mining season. Even though we would welcome a visit by our friendly FS representative, this hardly seems practicle for those miners that only operate for a week or as little as a week end. I would propose that the FS visit at least once for every week of operation, with a maximum of 5 visits. We only have a six-week season.

4. Table 2-1, Mitigation Measures lists the intakes having a 2/32 screen. It should read 3/32

5. Item 9 under the Terms and Conditions listed in the Environmental Consequenses should start with *"No"*

Larry Yount
Easy Does It #2

From: Vern Bretz [vbretz@fs.fed.us]
Sent: Monday, April 19, 2004 7:49 AM
To: mozingoj@saic.com
Subject: DEIS Comments

--------- Forwarded by Vern Bretz/R1/USDAFS on 04/19/2004 07:49 AM ---------

Tailddragger2@aol.com
04/18/2004 02:07 PM

To: vbretz@fs.fed.us
Cc:
Subject: DEIS Comments

Vern,
I forgot to state that I support Alternative 3 when I sent my last comments.

Thanks,

Larry Yount
Easy Does It #2